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ICAL AND SURGICAL

INATION QUESTIONS

AUBREY HUSBAND, M.B.

16

EXAMINATION-QUESTIONS

EXAMINATION-QUESTIONS

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EXAMINATION-QUESTIONS

IN

ANATOMY
PHYSIOLOGY
BOTANY
MATERIA MEDICA

SURGERY
MEDICINE
MIDWIFERY
STATE MEDICINE

ARRANGED BY

H. AUBREY HUSBAND, M.B.

M.C., M.R.C.S., L.S.A.

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NEW EDITION

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1876

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PREFACE

TO

THE SECOND EDITION.

A SECOND EDITION being called for, the compiler has taken every care to make the collection as complete as possible. Since the last edition was published Examinations in State Medicine have been instituted, and the Questions which have been given are now added.

In conclusion, a careful perusal of the Preface to the First Edition is earnestly requested.

H. A. H.

BENTINCK HOUSE,
STROUD GREEN ROAD:
Sept. 1875.

PREFACE TO THE FIRST EDITION.

THE STUDENT, just before presenting himself for examination, experiences great difficulty in concentrating the knowledge obtained in the lecture and dissecting-rooms. This difficulty I have attempted to remove by the following collection of Examination-Questions culled from the several Medical and Surgical Examining Boards of the United Kingdom, and from such other sources as gave completeness to the various subjects.

As the usefulness of a book of this nature depends upon the manner of using it, it may not be undesirable to offer a few remarks, and to make a suggestion which I believe will be found valuable.

The Questions are arranged under the following heads:—Anatomy, Physiology, Botany, Materia Medica, Surgery, Medicine, Midwifery, and State Medicine.

In Anatomy the questions are subdivided unde the parts of the body to which they severally refer, and those on Surgery and Medicine are in accordance with the classification adopted by Druitt and by Tanner.

The Student should read carefully on one day a portion of his text-book, and on the following endeavour to write out answers to the questions which correspond to the part he has previously studied. By so doing he will accustom himself to be ready and concise in answering, as well as gain that confidence which is so necessary on the day of examination.

The variety and comprehensiveness of these Questions leave no doubt that they will prove of the greatest assistance to all those desirous of becoming members of the Medical Profession, and of thoroughly preparing themselves for the severe tests to which in the present day they will be submitted.

H. A. H.

Bentinck House,
Stroud Green Road:
March 1871.

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EXAMINATION QUESTIONS.

ANATOMY.

HEAD AND NECK.

1. What muscles raise the soft Palate? To what extent is it elevated in deglutition?

2. Describe the distribution of the Blood-vessels of the Brain, and its influence on the cerebral circulation.

3. Describe the Parotid Gland, its structure and connections; also the sources of its blood-vessels and nerves.

4. Enumerate the bones in connection with the edges and surfaces of the Superior Maxillary Bone.

5. What muscles bend, and what muscles extend, the Head upon the spinal column?

6. Describe the apparatus for the secretion of the Tears.

7. Of what structures do the true Chordæ Vocales consist? what are their attachments? how are they acted upon? and what is their function?

8. Describe the origin, connections, and distribution, and functions of the Spinal Accessory Nerve.

9. Describe the position of the Lenticular Ganglion; mention the nerves with which it is connected, the branches which are derived from it, and their course and distribution.

10. Name the nerves of the Larynx, and describe their origin, course, distribution, and functions.

11. Name the muscles connected with the Lower Jaw, and describe the attachment of each to that bone.

12. State the origin and insertion of the Internal Pterygoid Muscles, and their precise action in mastication.

13. Describe the Iris: its position, attachments, and structure. Mention its blood-vessels and nerves, and state the function it exercises in vision.

14. Describe the Fifth Pair of Nerves within the Cranium, and mention the openings by which it leaves the cavity. Describe the course, distribution, and function of the Third Division of the Fifth Pair.

15. Describe the position, attachments (origin and insertion), and the precise action of the Pterygoideus Externus Muscle.

16. Describe the origin, course, and insertion of the oblique muscles of the Eye-ball.

Give the action of those muscles in the combined movements of the two eyes.

17. Describe the anatomy of the Iris of the human Eye-ball.

18. Describe the origin, course, and distribution to the muscles, of the small (motor) root of the Fifth Cranial Nerve; and state the place of origin, and the course, of the several branches of the inferior maxillary trunk along which the filaments of the motor root are conveyed to their destination.

19. Supposing the Head sawn through vertically on the left side of the *septum nasi*, describe the dissection required to obtain an inner view of Meckel's Ganglion, and its branches on the right side.

20. Give fully the dissection required to display the muscles which move the temporo-maxillary joint, and show the component parts of that articulation. Describe the articulation and its movements.

21. Describe the shape and position of the Occipital Bone, its connection with other bones, and the blood-vessels and nerves in its immediate vicinity.

22. Describe the boundaries of the Cavity of the Tympanum. Enumerate the parts found therein, and give the functions of these parts.

23. Describe generally the structures through which the rays of light pass before they reach the Retina, and state what changes they produce in the course of these rays.

24. Describe the situation, and the connections, with muscles, blood-vessels, and nerves, of the Submaxillary Gland and Duct. State also the chemical constituents of Saliva and its effects on Food.

25. Describe the form, course, and structure of

the Adult Trachea, and mention its relations to contiguous parts.

26. Describe the structure and uses of the soft Palate and Uvula, and mention the means by which their functions are effected.

27. Describe the Crystalline Lens; its position, relation to contiguous parts, connections (how it is held in its place), and structure. State also the use of the Lens in Vision.

28. Describe the joint between the Skull and the Atlas, and between the Atlas and the Axis. Mention the movements possessed by each of them, their extent (range), and the means by which they are limited. Mention also the ligaments pertaining to each of these joints.

29. Describe the general structure of the Tongue; its blood-vessels; its nerves and their functions; mention the muscular fibres which influence its different movements and changes of form.

30. Describe the Dura Mater in the Cranium, and mention its structure and uses.

31. Describe the Vitreous Body; and state the effect of the transparent media of the Eye in vision.

32. Describe the course, distribution, and function of the Hypoglossal Nerve.

33. Mention the various parts to which the Pneumogastric Nerves are distributed; and state what are the functions supposed to be conferred on each of these parts by this distribution.

34. What is 'Accommodation' of the Eye? Give proof of its existence. State the changes which occur in the Eye during the act of 'Accommodation,' with the methods by which they are ascertained. Mention also the most probable explanation of its mechanism, and the evidence on which the explanation is founded.

35. Describe the structure and functions of the Medulla Oblongata.

36. Give the divisions and branches of the Internal Maxillary Artery.

37. Name the muscles, and describe the vessels and nerves, with their branches, that are distributed to the Eye-ball and parts surrounding the orbit.

38 Describe the changes which take place in the Temporal Bone between birth and puberty.

39. Describe the velum interpositum, and the choroid plexuses of the brain; the veins of Galen; and the arteries supplying these parts.

40. Tabulate the muscles concerned in the rotation of the head. From what nerve and vessel is each muscle supplied?

41. The dissection of the glosso-pharyngeal nerve outside the skull.

42. Describe the Superior Maxillary Bone, and its connections with other bones, adopting the following order:—1st, the orbit-facial surface; 2nd, the naso-palatine surface, and the antrum; 3rd, the *margins.*

43. Commencing at the integuments, describe the dissection required to display the left Carotid Artery from its origin to its division into internal and external carotids, describing the parts as they are met in the course of the dissection, and mentioning the points of difference which exist in the relations of the common carotid on the opposite side of the neck.

44. Give an account of the Hypoglossal Nerve from its origin to the point at which it emerges from beneath the posterior belly of the digastricus. 2nd. Commencing the dissection at the integuments, describe the parts as they are severally brought into view in tracing the course of the nerve from the point mentioned to its termination, and also that of the Lingual Artery and its Branches.

45. Describe the parts (including the bones and ligaments) met with in dissecting the posterior region of the neck; the dissection to be carried as far as the vertebræ and posterior aspect of the scalenus posticus muscle, being limited below by the first rib, laterally by the outer edge of the scalenus posticus and point of the mastoid process, and above by the line of insertion of the sterno-mastoid muscle and superior curved ridge of the occipital bone.

46. What is the mode of development of the frontal and occipital bones, and in what condition are these bones at birth?

47. Describe the Cartilages of Larynx, and their *mode of connection with* each other.

48. Give the anatomy of the Corpus Striatum, describing its situation and immediate connections, and the arrangements of the white and grey matter within it (as seen with the naked eye). Describe also the parts met with in exposing the corpus striatum from the outer and lower part of the cerebral hemisphere.

49. The bones of the face and the ethmoid being removed, describe that portion of the basis of the Cranium included between the superciliary ridges of the frontal bone in front, a line extending between the mastoid processes, and in front of the condyles of the occipital bone, behind, and laterally between the lines drawn from the external orbital processes of the frontal to the mastoid processes. First mention the bones, and those portions of them which enter into the formation of the part to be described; then commence the description at the superciliary ridges, and describe the surfaces, sutures, processes, and foramina, in the order in which they are met with, mentioning the muscles when describing the parts to which they are attached.

50. Commencing the dissection at the integuments, and proceeding with it as far as the pharynx, and the bones forming the zygomatic fossa, describe the parts successively exposed in dissecting the space bounded above by the zygoma, below by the base of inferior maxilla, in front by the anterior margin of *the masseter*, and behind by the meatus auditorius,

mastoid process, and upper part of the sterno-cleido-mastoideus.

51. Describe that portion of the side and basis of the Skull which is bounded in front by the orbital process of the frontal bone and by the posterior surface of the malar bone; behind by a vertical line passing behind the mastoid process to the posterior part of the condyle of the occiput; superiorly by a horizontal line passing over the squamus suture, and internally by the mesial line. Commence the description at the upper limit, and mention the parts in the order in which they are seen in proceeding towards the mesial line.

52. Describe the parts met with in dissecting the branches of the Portio-Dura of the seventh pair of nerves after they have emerged from the Parotid Gland.

53. Describe the intrinsic muscles of the Larynx, mentioning their actions and explaining the chief uses to which they are subservient. Describe also the distribution of the Laryngeal Nerves, and state what is believed to be their respective functions.

54. Give a description of the Dura Mater; including its intimate structure, its extent and connections in the cranium and vertebral canal, its relations to the cranial and spinal nerves, the arteries which supply the membrane with blood, and the venous sinuses contained in it.

55. Describe the structure and connections of the

Tongue, and the blood-vessels and nerves distributed to it. Enumerate its principal movements and the muscles producing them, and state what are the most probable functions of its different nerves.

56. The head being divided by a vertical section in the median plane, and the dissection being commenced from the inside of the pharynx and fauces, and carried outwards to the integuments, you are required to describe in their order the parts that would be successively met with in so dissecting a space marked as follows:—above, by the zygoma, the body of the sphenoid and basilar process of the occipital bone; below, by the base of the inferior maxilla and great cornu of the os hyoides; behind, by the meatus auditorius, the mastoid process and the upper part of the sterno-mastoid, and anterior vertebral muscles; and before, by the anterior border of the masseter and tuberosity of the superior maxillary bone, so as to include the pterygo-maxillary fissure and posterior palatine canal.

57. Commencing at the integuments, give the dissection required to display—*First.* The course of the external Carotid Artery from its commencement to its division into internal maxillary and temporal arteries, pointing out its relations to other parts. *Secondly.* The course of the Lingual Artery and its branches, describing all the parts met with in the course of the dissection.

58. Give the anatomy of the Nose, describing it

bony parietes, its cartilages, the different orifices communicating with its cavities, its lining membrane, its blood-vessels and nerves.

59. Give an account of the form, situation, and internal structure of the Trachea and of the Bronchi as far as the point where they enter the lungs, describing their relations to adjacent parts.

60. The roof of the orbit being removed, describe the parts contained in that cavity in the order in which they are met with in dissecting them from above. The answer to include a description of the eyelids and lachrymal sac, but not of the eye-ball.

61. Give the dissection required to show the origin, course, and distribution of the Occipital Artery, describing the several parts exposed in the dissection.

62. Commencing at the integuments, describe the parts brought into view in exposing the Spinal Accessory Nerve, from the point where it escapes from beneath the Digastric muscle to its termination.

63. The malar, superior maxillary, nasal and inferior turbinated bones being removed on one side, describe the remaining walls of the orbit, and those parts of the skull brought into view by the removal of the bones as far back as the posterior margin of the external pterygoid plate. Commence at the superciliary ridge, and describe the surfaces, sutures, fissures, and foramina, in the order in which they are met.

64. The whole of the Brain, excepting the pituitary body, being removed, together with the intracranial part of the olfactory nerves; describe the parts which remain in the anterior and middle fossæ of the base of the cranium, commencing at the posterior limit, and describing them in the order in which they would be exposed; the description to include the surface of the bones.

65. Describe the parts (except the bones and ligaments) met with in dissecting the posterior region of the Neck; the dissection to be carried as far as the vertebræ and the posterior aspect of the scalenus posticus muscle, being limited below by the first rib, laterally by the outer edge of the scalenus posticus and the point of the mastoid process, and above by the superior curved ridge of the occipital bone.

66. Commencing the dissection at the integuments, describe the parts brought into view in exposing the Omo-Hyoideus from the point at which it emerges from behind the clavicle to its insertion.

67. Give an account of the structure and arrangement of the Choroid Coat and Iris; mentioning briefly the uses assigned to these parts of the organ of vision.

68. Give an account of the cervical portion of the Vertebral Column, pointing out the characters which distinguish the several parts of the bones of this *region from the* corresponding parts in the dorsal

and lumbar regions; and describe especially the Atlas and Dentata. Enumerate the ligaments, and mention the movements which take place in this region, including those between the Cranium and the Atlas, and between the Atlas and the Dentata.

69. Describe in their order of position the parts which would be brought into view in dissecting the origin and course of the phrenic and recurrent nerves on the right side of the neck. The phrenic to be traced only as far as the first rib, and the recurrent to the lower border of the larynx.

70. Give an account of the Tympanum of the Ear; comprehending a description of its osseous parietes, and of the parts contained in it in the recent subject.

71. The Pharynx being opened posteriorly in the middle line and its whole length, describe the parts brought into view in the order in which they are seen from the basilar process to the lower margin of the cricoid cartilage. The mucous membrane being removed, describe the parts then exposed. The answer to include an account of the form and structure of the soft palate and its arches, the tonsils, and the interior of the Larynx.

72. State the steps of the dissection required to display the Facial Artery and its branches (except the palatine and tonsillar), mentioning the other parts exposed in the dissection; and pointing out their relation to the vessels in question.

73. Describe the parts seen on the surface of a section of the brain made in the median line.

74. Describe the osseous labyrinth of the human Ear, with the meatus auditorius internus and other passages immediately communicating with the cavities of the labyrinth.

75. Describe the form, situation, and connections of the Thyroid Gland.

76. Give a description of the eyelids, the conjunctival membrane, the lachrymal gland, and the lachrymal passages.

77. Describe, in the order in which they would be met with, the parts brought into view in fully exposing by dissection the anterior surface of the Scalenus Anticus muscle.

78. Give an account of the cartilages of the Larynx, their articulations with each other, and the ligaments connecting them. What difference of internal structure is observed among the different cartilages and ligaments of the Larynx?

79. Give a description of the form, dimensions, and structure of the Trachea.

80. Describe the Inferior Maxillary Bone; its mode of ossification and the changes which it undergoes at different periods of life. Describe also the Articulations of the Lower Jaw, and its movements, mentioning the muscles by which they are severally effected.

81. State the dissection required to show the

course of the Deep Cervical Artery on the posterior aspect of the vertebræ, commencing with the integuments on the back of the neck, and describing the several parts exposed, in the order in which they appear in the dissection.

82. Describe, in the order of their appearance, and as far as they would necessarily come into view, the parts that would be met with in fully exposing by dissection the Stylo-pharyngeus Muscle.

83. Give an account of the structure of the human Eye-ball: compare the structure of the Eye with that of the Ear.

84. Give the dissection required to expose the Recti and Obliqui Capitis Postici. Describe these and the other muscles exposed, with their attachments as far as seen within the limits of the dissection, and explain their several actions. Mention also the vessels and nerves met with in the course of the dissection.

85. Give an account of the Organ of Hearing, describing the Pinna and the Meatus, their muscles, nerves, cartilage and ligaments; the Tympanum and its contents, with the Eustachian tube; and the osseous portion of the Labyrinth.

86. Give the dissection required to display the origin, course, and distribution of the occipital artery; commencing with the integuments, and describing in the order of their appearance the several parts exposed in the dissection.

87. Describe the parts (except the bones) met with in dissecting the posterior region of the neck; the dissection to be carried as deep as the vertebræ, and the posterior surface of the scalenus medius muscle—being limited below by the first rib, above by the superior curved ridge of the occipital bone, and laterally by the point of the mastoid process, and the outer border of the scalenus medius.

88. The head being divided by a vertical median section, and a dissection commenced from the inside of the pharynx and fauces, and carried outwards as far as the integuments, you are required to describe, in the order in which they would present themselves, the parts which would be met with in such a dissection, supposed to be limited as follows:—above by the zygoma, the body of the sphenoid, and the basilar process of the occipital bone; below by the hyoid bone; behind by the meatus auditorius and the mastoid and anterior border of the masseter and tuberosity of the superior maxillary bone, so as to include the pterygo-maxillary fissure and posterior palatine canal.

89. Describe the external configuration and the position of the Teeth of the adult, and their internal structure so far as it can be discerned with the naked eye.

90. Give an account of the structure of the temporo-maxillary articulation and the movements of which the lower jaw and its condyles are susceptible.

mentioning the muscles by which these movements are effected. Point out any provisions in the construction or in the attachment of muscles which are calculated to allow freedom of motion, or to maintain security of connection. Describe also the condition of the lower jaw in the new-born infant, its manner of growth, and the changes it undergoes at subsequent periods of life.

91. Mention the parts seen in exposing the sterno-cleido mastoid muscle, describing them and their relative position in detail, but only so far as they must be necessarily seen; describe similarly the subjacent parts which come into view when the muscle is raised. Lastly, give a full description of the muscle and its actions.

92. Describe the order in which they would appear, the parts met with in fully exposing the anterior surface of the Scalenus Anticus.

93. Describe those portions of the facial bones which enter into the formation of the lachrymal passages. Give an account of the structure of the eyelids, the form and position of the Lachrymal Gland, and its ducts, the puncta, lachrymal sac and duct.

94. The upper and posterior parts of the Cerebrum, the Corpus Callosum, the Fornix, and the Velum having been removed, and the fourth ventricle laid open by a vertical incision through the

middle of the Cerebellum; describe the parts thus exposed, commencing at the fore part.

95. The Pharynx having been opened at its back part, describe the soft Palate, its Pillars and the Tonsils, the Isthmus faucium, the base of the Tongue, the Epiglottis, the superior aperture and the interior of the Larnyx, as seen without opening it.

96. Describe the parts met with in dissecting the Spinal Accessory Nerve, from the point where it escapes from beneath the Digastric muscle to its termination.

97. The roof of the cranium having been taken off by a section, passing about an inch above the orbits and occipital protuberances, and the whole of the encephalon, except the pituitary body, having been removed, together with the intracranial part of the olfactory nerves; describe the remaining portion of the dura mater, the nerves, and the other parts in the base of the skull, including the surfaces of the bones. The description to be commenced anteriorly.

98. Give an account of that portion of the basis of the cranium which is bounded in front by a line drawn across the tuberosities of the superior maxillary bones (so as to include the pterygo-maxillary-fossa) behind by a curved line passing from the apex of the mastoid process of one side, behind the Foramen Magnum, to that of the other side, and laterally by

the margin of the Meatus Auditorius Externus and the Zygoma. Commencing in front, mention them in the order in which they are seen, the bones and sutures, the foramina and the structures occupying them, and the surfaces for the attachment of muscles.

99. Commencing at the integuments, give the dissection required to expose the submaxillary gland and its duct, and the sublingual gland, describing briefly the parts met with in the course of the dissection. The answer to include an account of the form, size, position, and structure of these glands.

100. Describe the origin and course of the branches of arteries, veins, and nerves, which are supplied to the hairy scalp.

101. Give an account of the muscular attachments of the Tongue, and of the action of each muscle you describe.

102. State the steps of a dissection needed in an entire Brain to show the *hippocampus minor*, the *hippocampus major*, and the eminentia *colateralis* or *pes accessorius*. Describe the situation, characters, and construction of those bodies.

103. Give with precision the origin, insertion, and use of the Recti muscles of the head.

104. With a fresh Temporal bone, state how you would proceed to lay bare the muscles of the ossicles of the Tympanum. Conduct the dissection in such order as to insure a sight of all the muscles on the *same preparation.* Describe each muscle as the dis-

section shows it, and give the separate and combined actions of each.

105. The cerebellum, tuber annulare and medulla oblongata being removed, describe the under surface of the cerebrum, including the vessels and nerves, and the parts necessarily seen in exposing the under surface of the corpus callosum in its whole length.

106. Describe—(a) the Position; (b) the Length and Thickness; (c) the Relations; (d) the Connections; (e) the minute Structure of the Corpus Callosum.

107. Give step by step the dissection required to display the whole length of the right Lingual and Ranine Arteries. State the relative position of each object you would meet with in the course of the dissection.

108. Give an account of the method you would pursue in order to remove the Brain from the cranial cavity. Commencing at the integuments, name in proper order the various structures you would have to cut through in the course of your dissection.

109. Describe step by step the dissection necessary to expose the whole length of the External Carotid Artery. Name its branches in their order of origin.

UPPER EXTREMITY.

1. Describe the course and relative position of the Brachial Artery. Name the branches it gives off, and trace the Profunda branch to its termination.

2. Describe the position, shape, and attachments of the Deltoid Muscle. Name the different structures which are exposed on reflecting the Deltoid from its attachments to the Scapula and Clavicle.

3. The Thumb.—Describe the position of the Thumb, its bones, its articulations, its capability of motion, and the muscles by which its movements are effected.

4. Describe the position and attachments (origin and insertion) of the Biceps Flexor Cubiti, the Brachialis Anticus, the Supinator Radii longus and brevis, the Pronator Radii Teres, and Pronator Quadratus. Mention the precise action of each muscle, and the nerve by which each is supplied.

5. State what muscle separates the Teres Minor from the Teres Major; describe the spaces left between the three muscles, and the vessels and nerves which pass through the spaces in question.

6. Give the course, relations, and distribution (including anastomoses) of the Ulnar artery.

7. Enumerate the structures divided in amputation of the Elbow-joint.

8. Describe the course of the Brachial Artery,

pointing out its relative position with respect to the contiguous muscles, nerves, and veins.

9. Describe the course and relations of the Brachial Artery; and state how the circulation is carried on when it is tied in the middle of the arm.

10. Describe the dissection required to expose the Boundaries of the Axilla and its contents. Mention particularly the relative position of all parts of importance contained within; and state how these relations may be influenced and altered by a dislocation of the Head of the Humerus downwards below the Glenoid Cavity.

11. Describe the Clavicle, the joints it assists in forming, and the means by which this bone is kept in its normal position. What muscles are attached to the Clavicle?

12. Describe the structure, attachments, and uses of the anterior Annular Ligament of the wrist-joint. Enumerate the parts passing under it, and mention their relative position.

13. Describe the carpo-metacarpal, the metacarpo-phalangeal, and the phalangeal joints of the Middle Finger; mention the movements possessed by each of these joints, and the muscles which are engaged in each movement.

14. Describe the connection between the Radius and the Ulna—namely, the osseous surfaces of the joints, with the ligaments and membranes. Also

state the kind of movement which the Radius describes at its upper and its lower end.

15. The whole of the Pectoralis major being removed, mention the various parts exposed, and their relative position.

16. What muscles of the Fore-arm receive branches from the following nerves—median, ulnar, musculo-spiral, and posterior interosseous?

17. What nerves enter into the formation of the Brachial Plexus? Name its branches.

18. Describe in their order the parts you would meet with in dissecting from the integuments of the neck to the posterior surface of the scapula and teres major muscle.

19. Give an account of the principal arterial inosculations which exist in the limbs, including those of the shoulder and hip.

20. Describe the steps of the dissection required to display the course of the Radial Artery, from its origin to the point at which it disappears between the metacarpal bones of the thumb and fore-finger, and of the branches given off in this part of its course.

21. Give an account of the joints formed by the Radius and Ulna with other bones, and with each other; the answer to include a description of the articular surfaces of the several bones, and of the cartilages, synovial membranes and ligaments. De*scribe the movements* which take place in these

joints, mentioning the muscles by which they are effected, and the classes of joints to which they belong. In what respects do the movements which take place in these joints differ from those which take place in the corresponding joints of the leg.

22. Give the dissection required to expose the Subscapular Artery and its branches, describing the parts met with in the dissection, as far as they are necessary, and brought into view.

23. Give an account of the articulations of the Scapula with the Clavicle and Humerus, describing the articular surfaces, the ligaments, the synovial membranes, and the articular cartilages, and the proper ligaments of the scapula. Describe the movements which take place in these joints, and also those of the Sterno-Clavicular articulation, mentioning the muscles by which they are severally effected.

24. Commencing at the integuments, state the dissection required to show the course of the Radial Artery, from its origin at the bend of the elbow to the termination of the deep palmar arch. Describe the relations of the artery to the structures in the different parts of its course, and mention the branches in the order in which they arise, but describing the course of those branches only which are necessarily seen in the steps of the dissection required to expose the main artery.

25. Commencing at the integuments, describe the parts met with in dissecting a portion of the front

surface of the Arm and Fore-arm, bound above by a transverse line drawn three inches above the bend of the elbow, and below by a line crossing the insertion of the pronator teres. The dissection to be carried to the bones.

26. Give the dissection required to bring into view the origin, course, and distribution of the Transversalis Humeri (supra-scapular) and Transversalis Colli Arteries, describing the situation, relatively to the Arteries and to each other, of the several parts which must be exposed in the dissection.

27. Give the dissection required to display the Supinator and Extensor Muscles on the Fore-arm and back of the Hand; describing, in the order in which they would be exposed, the muscles, fasciæ, and ligaments, as well as the vessels and nerves met with in the dissection.

28. Describe the parts situated on the palmar aspect of the Hand in the order in which they present themselves in dissection.

29. State the dissection required to display the Musculo-spiral Nerve and its branches from the point where it leaves the axilla to the wrist; mentioning the different parts exposed in the process, and describing their situation relatively to the nerve and to each other. The attachments of the muscles not to be given.

30. Give the anatomy of the Elbow-joint, describing the articular ends of the bones, the ligaments

and the synovial membrane. Mention the movements which take place at this articulation, and the muscles by which they are effected.

31. Give a description of the distal row of the carpal bones, and their articulations with each other and with neighbouring bones, mentioning the points of attachment of muscles.

32. Describe the several parts which would be brought into view in dissecting and removing the short muscles of the thumb and abductor indicis.

33. Describe the lower extremities of the Radius and Ulna, and those bones of the Carpus which are articulated with them, mentioning the grooves for the passage of tendons. Describe the Wrist-joint, its cartilages, synovial membranes and ligaments, mentioning the structures which are in contact with it. To which class of joints does the wrist-joint belong? What movements take place in it, and by what muscles are they severally effected?

34. Describe, in the order in which they appear in dissection, the parts situated in the lower half of the Arm, and in the Fore-arm. The dissection is to be limited above by the insertion of the deltoid muscle, and below by the lower ends of the radius and ulna. The bones are not to be described, and the elbow-joint is not to be opened.

35. Describe carefully the parts, except the bones, which would be seen in dissecting the two innermost fingers, and corresponding part of the Hand; the por-

tion dissected being such as would be separated the rest of the hand by an incision carried the middle of the interosseous space between ring and the middle fingers and continued thro the carpus as far as the wrist-joint.

36. Describe in the order of their appearance parts which would be successively brought into vi in fully exposing by dissection the anterior surfa of the Pronator Quadratus.

37. Give the dissection required to expose t parts occupying that portion of the back of the han which is included between the Extensor Primi Inter nodii Pollicis, and bounded above by the posterio annular ligament, including the interossei muscle seen in the space.

38. Describe the anatomy of the Shoulder Joint, and state precisely the *insertion* of the various muscles which act directly on the articulation.

TRUNK.

1. What are the attachments, disposition, connections, and function of the *Levatores* and *Sphinctor Ani*? Describe especially the endowments, muscular and nervous, by which the Sphinctor Ani is fitted for its office, and how far its agency is voluntary, involuntary, or of a mixed character.

2. Describe the course of the *Urethra*, its dilata-

tions and contractions, its structure, [illegible]ts [illegible]tory ducts which open into it.

3. Describe the *Ovaries* and *Fallopi*[illegible] respect of their form, situation, attachment[illegible] and function. State also what is meant by [illegible]*pus luteum.*

4. Describe the origin, course, and relations of the Subclavian Artery, on each side, and enumerate its branches.

5. Describe the situation, connections, and actions of the Heart.

6. State the total number, and the number of each division of the Spinal Nerves; describe the manner in which they emerge from the Vertebral Column, and in which the separate roots are connected with each other, while situated within the vertebral canal.

7. Name, in their order from without inwards, the structures which fill the space between Poupart's Ligament and the Pelvic bone.

8. Describe the position and the boundaries of the Femoral Ring; and name the Blood-vessels which are close to it, mentioning their position with respect to the ring.

9. State the position of the Cæliac Axis, name its branches, and describe their course and distribution.

10. Describe the arch of the Aorta, and its relations to the contiguous structures. Name the vessels which arise from it, and describe their course as far as the *upper opening* of the chest. State the prin-

cipal irregularities which occasionally occur in the origin and course of these vessels.

11. Describe the structure of the Placenta, and the mode of its attachment to the Uterus. Describe the circulation of the blood through the Placenta between the Mother and the Fœtus.

12. Describe the situation, attachments, and structure of the Urinary Bladder. Mention the portions of the Bladder which are not covered by Peritoneum, and the structures with which those portions are contiguous.

13. Mention the muscles which enlarge the Capacity of the Chest during ordinary Inspiration. Explain the mode by which ordinary Expiration is effected.

14. Describe the coverings of the Testicle. Mention the different structures which compose the Spermatic Cord; and state whence they are derived, and where they terminate.

15. Describe the course and relations of the left common iliac artery.

16. Describe the constituents of the roots of the lung on either side, in their several relations to each other, and to the neighbouring parts; and state their mode of distribution within the lung.

17. Describe the shape and structure of the Trachea, Bronchial Tubes, and Air Cells.

18. Describe the Cœcum Caput Coli, and add an account of the action of the Ileo-cœcal valve.

19. The Abdomen being open, but the contents undisturbed, specify by what dissection the part of the *inferior vena cava* below the liver may be laid bare without the removal of any of the viscera from the body. Give the topographical anatomy of the *inferior* cava. Mention the veins from which it receives blood, their place of union with the trunk, and the difference in their mode of termination on the right and left sides.

20. Describe the naked-eye characters of transverse sections of the spinal cord in the cervical and lumbar enlargements, and in the middle of the dorsal region.

21. Describe the anatomical composition of the Spermatic Cord; its connections in the wall of the abdomen, and the coverings which it derives from that wall.

22. Describe the dissection which would be needed to bring into view the internal Mammary Artery and Vein with their branches, and the anastomoses of the several branches.

23. Describe the steps of the dissection necessary to lay bare the Brachial Plexus in the neck and axilla. Trace out those branches of the plexus which are distributed to muscles attached by one end to the scapula. The branches of the plexus are to be afterwards stated; but without further description.

24. Describe the dissection of the triangular space *of the Abdominal* Wall that is bounded above by

line drawn from the anterior superior spine of the Ilium to the Umbilicus, below by Poupart's Ligament, and to the inner side by the Mesial Line of the Body. State what forms of Hernia may be met with in this space, and how they differ anatomically from one another.

25. What is the nature of the muscular structure of the Heart? How is it covered externally and internally? Give the course of the blood-vessels of the heart itself. Describe and explain the sounds of the healthy Heart.

26. Where are the Testicles situated in early fœtal life? Describe by what agencies they are conveyed into the scrotum. What are their coverings in the belly, and in the scrotum? and whence are these coverings derived? Where do the arteries of the Testicles arise, and where do the veins terminate?

27. Describe the structure of the Lobule of a Lung.

28. Describe the form and position of the Pancreas, and its relations to contiguous parts. Describe its structure and uses, its blood-vessels, nerves, and ducts.

29. Describe the structure of a single Lobule of the Liver. Enumerate the Constituents of Bile; and state the effects it has on digestion.

30. Into what Regions is the Abdomen divided? State the boundaries of each Region, and the structures which are situated within it.

31. Describe the First Rib, its form, position, and degree of mobility. In what respects does this rib differ from all the others? What muscles are attached to, and what great vessels are in contact with its upper surface.

32. Describe the changes which take place in the form and capacity of the Thoracic Cavity during ordinary inspiration; and state by what agencies these changes are effected.

33. Describe the structure of an Adult Testicle, and trace its excretory duct from its commencement to its termination.

34. Describe the course and relative situation of the External Iliac Artery in the male adult. Describe also the Epigastric branch of this artery; its origin, course, and anastomotic communications; mention also its relative situation with respect to the Internal and to the External Abdominal Rings, and to the Inguinal Canal.

35. Describe the structure of the Kidney, the characters and chemical composition of Healthy Urine, and how this secretion contributes to maintain health.

36. Describe the peculiarities of the first and last Dorsal Vertebræ.

37. Describe the mechanism of the Circulation of the Blood between the Heart and the Lungs, to and fro; and the changes the Blood undergoes in its *passage through* the Lungs.

state the kind of movement which the Radius describes at its upper and its lower end.

15. The whole of the Pectoralis major being removed, mention the various parts exposed, and their relative position.

16. What muscles of the Fore-arm receive branches from the following nerves—median, ulnar, musculo-spiral, and posterior interosseous?

17. What nerves enter into the formation of the Brachial Plexus? Name its branches.

18. Describe in their order the parts you would meet with in dissecting from the integuments of the neck to the posterior surface of the scapula and teres major muscle.

19. Give an account of the principal arterial inosculations which exist in the limbs, including those of the shoulder and hip.

20. Describe the steps of the dissection required to display the course of the Radial Artery, from its origin to the point at which it disappears between the metacarpal bones of the thumb and fore-finger, and of the branches given off in this part of its course.

21. Give an account of the joints formed by the Radius and Ulna with other bones, and with each other; the answer to include a description of the articular surfaces of the several bones, and of the cartilages, synovial membranes and ligaments. *Describe the movements* which take place in these

joints, mentioning the muscles by which they are effected, and the classes of joints to which they belong. In what respects do the movements which take place in these joints differ from those which take place in the corresponding joints of the leg.

22. Give the dissection required to expose the Subscapular Artery and its branches, describing the parts met with in the dissection, as far as they are necessary, and brought into view.

23. Give an account of the articulations of the Scapula with the Clavicle and Humerus, describing the articular surfaces, the ligaments, the synovial membranes, and the articular cartilages, and the proper ligaments of the scapula. Describe the movements which take place in these joints, and also those of the Sterno-Clavicular articulation, mentioning the muscles by which they are severally effected.

24. Commencing at the integuments, state the dissection required to show the course of the Radial Artery, from its origin at the bend of the elbow to the termination of the deep palmar arch. Describe the relations of the artery to the structures in the different parts of its course, and mention the branches in the order in which they arise, but describing the course of those branches only which are necessarily seen in the steps of the dissection required to expose the main artery.

25. Commencing at the integuments, describe the parts met with in dissecting a portion of the front

perties of Mucous membrane in general; and describe that of the stomach, and of the small and large intestines in particular; the description to include an account of the ultimate arrangement of the blood-vessels, the epithelium, the follicles of Lieberkühn and the Glands of Brunner and Peyer.

54. Give the anatomy of the Rectum; describing the structure, form and situation of the intestine, its blood-vessels and nerves, and its relations to the Peritoneum and other adjacent parts in the two sexes.

55. State the dissection required to expose from the interior of the abdomen the Obdurator and Epigastric arteries, the former from its origin to its entrance into the obturator foramen, the latter as far as the point where it becomes concealed by the sheath of the rectus muscle. Describe the parts brought into view in the dissection, the chief variations to which the vessels in question are subject, and the relations of their vessels to the inguinal and crural apertures.

56. In what respects do Congenital, Oblique, and Direct Inguinal Herniæ differ from each other with regard to their mode of formation, and their relations to the Inguinal Canal, the Spermatic Cord, and the Epigastric Artery?

57. Give a description of the Stomach, including its form, dimensions, relative situation and connections, the nature and arrangements of its several coats, with the glands which open on its inner sur-

face; the construction of its pyloric orifice, and the situation and mode of distribution of the vessels and nerves of the organ. Mention the leading constituents and most characteristic properties of the Gastric Juice, and describe briefly the changes which the food undergoes in the stomach.

58. The abdominal muscles and the ossa pubis being removed, describe the Pelvic Viscera as they are seen *in situ* in the male; and opening the bladder, and the urethra through its whole length, describe the dimensions of the latter in its different portions, and the internal surface of both, and also the appearances of the surface of the divided cavernous and spongy bodies. Continuing the dissection from above downwards as far as the rectum, describe the parts situated between it and the bladder.

59. Give an account of the Dorsal Region of the Vertebral Column, mentioning the characters by which the vertebræ of that region differ from those of the neck and loins, as well as the marks by which certain dorsal vertebræ may be distinguished from the rest. Describe also the several articulations and ligaments by which the dorsal vertebræ are connected with each other and with the ribs.

60. Describe the construction and explain the mechanism of the different Valves placed between the auricles and ventricles of the heart, at the orifices of the Aorta and pulmonary artery, and in the veins. What veins are known to be destitute of valves?

61. Give a description of the Cœcum and of the Ilio-colic Valve, and state the differences in point of structure between the great and small intestines.

62. The walls of the abdomen being removed, describe the Lesser Omentum and Glisson's Capsule, their attachments and contents; the position and boundaries of the Foramen of Winslow, and the position of the Duodenum and Pancreas, and their relations to other parts.

63. Describe the external configuration and internal structure of the Testis, the composition of the Spermatic Cord, the blood-vessels, lymphatics and nerves belonging to these parts, and the nature and arrangement of their coverings; the description to be limited above by the external abdominal ring.

64. Give a brief account of the system of the Vena Portæ, mentioning its condition in the fœtus, the changes which take place after birth, and many points in which it resembles or differs from the general venous system; and the walls of the abdomen being removed, describe the steps of the dissection required to expose the course of the Splenic Vein, the terminations of the Inferior and Superior Mesenteric Veins, and the trunk of the Portal Vein as far as its entrance into the Liver; mentioning the relations of those veins to other parts.

65. Describe the situation, connections, form and structure of the Uterus, Vagina, Fallopian *Tubes, and Ovarics,* with their vessels and nerves.

66. Give an account of the Inguinal and Femoral canals, describing their orifices, boundaries, and contents; and give the origin and the course of the Epigastric Artery, the varieties in the origin and course of the Obturator, and the relations of these vessels respectively with the canals. Explain the mode of formation of Congenital and of the other forms of Hernia which occur in this region.

67. Describe the inferior surface of the Liver, mentioning the parts with which it is in relation. Give an account of the form, situation, and structure of the Gall bladder, and ducts, and describe the vessels as far as seen outside the liver; mentioning their condition at the time of birth, and the changes which they undergo afterwards. Explain the circulation of blood through the Liver.

68. Give a description of the form, relative situation, connections, and structure of the Bladder and Prostate Gland.

69. Give an account of the structure, course, and connections of the Large Intestine, from its commencement to its termination, describing the Iliocolic Valve, and noticing specially the points in which the large differs from the small intestine. In your account of the Rectum, describe its relations to the adjacent parts in the two sexes.

70. Describe the parts seen in the auricle and right ventricle of the Heart. Mention the peculiari*ties of the heart* and pulmonary artery of the Fœtus

71. Give a description of the oblique, transverse, and straight muscles of the abdomen; and explain their actions and uses.

72. Describe, in the order in which they lie, the parts which are seen in dissecting these muscles; the dissection being carried down to the surface of the transversalis and posterior wall of the sheath of the rectus, and being limited behind by the outer border of the quadratus lumborum.

73. Give the anatomy of the Duodenum; comprehending a description of the form and situation of that intestine, its relations to adjacent parts, the blood-vessels and nerves distributed to it, the structure and arrangements of its coats, and the points in which it differs from the Jejunum and Ilium.

74. Describe the external configuration and the internal surface of the auricles of the heart.

75. Give an account of the general characters of the ribs, the characters by which certain ribs are distinguished from the others, and the articulations of these bones with the Vertebral Column. Mention the muscles chiefly engaged in the elevation and depression of the ribs.

76. The Heart being removed, and the dissection commenced at the back part of the Pericardium, describe the parts met with behind that membrane, in front and at the sides of the spine, as far as the commencement of the intercostal muscles.

77. The anterior wall of the abdomen being re-

moved, give an account of the dissection required to show the course of the Gall ducts from the Liver to the Duodenum, and the position and relations of the Duodenum and Pancreas, mentioning all the parts necessarily seen in the course of the dissection. Give a description of the Pancreas, comprehending its form, dimensions, weight, connections, and internal structure.

78. Describe the situation, connections, form, and structure of the Uterus, Vagina, Fallopian Tubes, and Ovaries, with the vessels and nerves pertaining to these parts.

79. Describe the Sacrum and Fifth Lumbar Vertebra, and their mode of connection with each other and with adjacent bones; mentioning the points of attachment of muscles.

80. Commencing at the skin of the Perinæum, give the dissection required to expose as much ot the Levator Ani as can be seen in this situation, describing the parts in the order in which they occur.

81. In what respects do the heart and great vessels of the Fœtus differ from their condition in after life?

82. Describe the nature of the Spleen; enumerate the other organs which more or less resemble it, and state in what classes of animals a spleen is found.

83. The bladder and the parts of generation of

the male having been removed from the body, and the bladder opened in front, and the urethra along its upper part, describe the internal surface of these parts, and the surface of the section of the Corpus Cavernosum. Then, turning to the lower surface of the same parts, describe the bulb and its structure, and the parts behind it.

84. Give a description of the Tenth, Eleventh, and Twelfth Dorsal Vertebræ, and of their articulation with the ribs and other vertebræ.

85. The abdomen having been opened, give the dissection required to expose the Duodenum and Pancreas, and give an account of the position, form, and relations of these organs, with their blood-vessels. Then, opening the Duodenum, describe its internal surface, and mention in what respects that differs from the internal surface of the Ilium, and of the large intestine. Having removed the Duodenum and Pancreas, describe the parts which lie immediately behind them.

86. The abdomen having been opened, and the peritoneum removed from its anterior wall, describe the inner orifices of the Inguinal and Crural Canals, their form and position, the relation of the Epigastric Artery to the former, and the occasional relation of the Obturator Artery to the latter. Pursuing then the dissection from within outwards, describe the parts entering into the formation of the Inguinal

Canal, mentioning its length, direction, and contents.

87. The abdomen being opened, give the steps of the dissection required to expose the Splenic Vein, and the Portal Vein from its commencement to its entrance into the Liver, mentioning the size, length, and direction of these veins. The answer to include an account of the position, form, and relations of the Pancreas and Duodenum, and of Glisson's Capsule and its contents.

88. Give a description of the Spinal Cord (not including the Medulla Oblongata) comprehending its external configuration, its internal structure, so far as visible to the naked eye, and its envelopes. Describe also the spinal nerves as far as the junction of their anterior and posterior roots, together with the blood-vessels contained within the vertebral canal.

89. Describe the characters of the spinous, transverse, and articulating processes of the vertebræ in the different regions of the spinal column, distinguishing any which are unlike the rest in the region to which they belong. State the mode of ossification of a lumbar vertebra.

90. Describe the parts seen in dissecting the Scrotum, and in exposing the Testicle and Spermatic Cord as high as the external abdominal ring. Give an account of the parts of which the spermatic

cord is formed, and of the form, coverings, and outward relations of the testicle.

91. State the steps of a dissection suited to expose the internal mammary artery and its branches in their whole extent, mentioning the situation (but without detailed description) of the parts which require to be dissected or removed in the process. Then describe fully the origin, course, and distribution of the artery, its relations to adjacent parts, and its anastomoses with other vessels.

92. Describe, in the order of their appearance (but only as regards their extent and situation), the parts which would present themselves in the dissection of a space bounded by the spines of the lumbar vertebræ, and by a line drawn parallel to them from the twelfth rib to the crest of the Ilium; the dissection to be carried as far as the posterior surface of the quadratus lumborum.

93. State the peculiarities of the heart, blood-vessels, and liver of the mature fœtus, by which these organs differ from their condition in the adult.

94. Describe the articulations of the sacrum with other bones.

95. Describe the position of the different Anastomoses between the branches of the internal iliac and femoral arteries.

96. The chest having been opened in the ordinary way for the dissection of its contents, the lungs cut *away near their roots*, and the heart and pericardium

removed, state the steps of a dissection which will expose the Thoracic Duct from the diaphragm to its termination.

97. Describe the dissection of the posterior primary branches of the Sacral Nerves in this manner:—Begin with the most superficial offsets, and carry the dissection downwards as far as the common trunks from which the anterior and posterior primary branches spring, so as to show, from without inwards, each fact in the anatomy of the nerves and their branches.

98. In a body with the abdomen open and the viscera above the pelvis removed, but with the pelvic viscera untouched, state how you could bring into view, on the right side, the Internal Iliac artery in the female, and each of its branches within the pelvis.

99. Compare the anterior primary branch (intercostal) of the Second Dorsal nerve, with the two abdominal branches—ilio-hypogastric and ilio-inguinal—of the First Lumbar nerve, and point out the resemblances and differences between them in course, connections, and branches.

LOWER EXTREMITY.

1. Describe the parts situated on the middle and back part of the Leg, in the order in which they *appear on dissection.*

2. In what state of the limb is the partial rotation of the Tibia upon the Femur possible, and by what muscles is it effected?

3. What are the boundaries of the Popliteal space? What are the actions of the Ham-string Muscles? And what is the relative position of the great Vessels and Nerves contained in the Ham?

4. State precisely the terminal attachments of the crucial ligaments and semi-lunar fibro-cartilages of the Knee-joint; and specify the attachments of the ligamentous bands connected with the fibro-cartilages.

5. Describe the astragalo-scaphoid and calcaneo-cuboid articulations of the Foot. Afterwards, describe the muscles which produce inversion and eversion of the foot, through movements of those joints.

6. What dissection is necessary to expose the several arteries at the back of the lower limb, between the crest of the Ilium and the knee-joint? Enumerate those arteries, and mention their respective anastomoses.

7. Describe the parts met with, and their relations to one another, in the dissection of the Ham down to the bones, in a space extending from four inches above to two below the knee-joint.

8. Give the attachments of the Glutæus maximus, all the peculiarities of this muscle, and its functions. How is it supplied with blood and nerves?

9. Describe the Semi-lunar Cartilages of the

Knee-joint; their structure, form, attachments, uses, and mode of action.

10. What are the ligaments of the Knee-joint?

11. Name the muscles that are attached to the Ilium.

12. Describe the ligamentous articulations of the astragalus and os calcis with the scaphoid and cuboid bones.

13. What movements are admitted in these joints?

14. What muscles are engaged in the different movements of these joints?

15. The dissection of the trunk of the peroneal artery and its branches, and the anastomoses with other vessels.

16. Describe the Patella, the lower extremity of the Femur, and the upper extremity of the Tibia. State the dissection required to display the several structures constituting the knee-joint, *mentioning* the parts met with in the dissection, and *describing* the ligaments, the articular and inter-articular cartilages, and synovial membrane.

17. Give an account of the motions of the Knee-joint, mentioning the several muscles by which they are effected.

18. Describe the parts brought into view on removing the Glutæus Maximus Muscle, and state the actions of the gluteal and other muscles of that region.

19. Describe the steps of the dissection required to display the course of the Posterior Tibial Artery from its origin to its division into the plantar arteries, and of its branches, as far as they can be seen on the back of the leg.

20. Describe the parts (excepting the bones and ligaments) as they are successively exposed in dissecting a portion of the anterior region of the Thigh, bounded above by Poupart's ligament, and below by a transverse line corresponding with the lower limit of the insertion of the adductor brevis; the dissection to be carried down to the anterior edge of the gluteus medius, the hip-joint, obturator membrane, and anterior surface of the adductor magnus.

21. Give an account of the Popliteal region, describing its form and boundaries, and the parts contained in it, commencing the dissection at the skin, and carrying it to the bones.

22. Describe the Astragalus and Os Calcis (mentioning the surfaces of the attachment of ligaments and muscles and the grooves for the passage of the tendons), their articulations and connections with each other and with other bones, and the movements which take place in the several joints into the formation of which they enter.

23. Describe the parts situated in the plantar region of the Foot (except the bones) in the order in which they present themselves on dissection.

24. State the dissection required to expose the

Peroneus Longus in its whole course from its origin to its insertion, mentioning its relations to other parts. In the dissection of the sole of the foot commence at the skin, and mention, in the order in which they are seen, all the parts which intervene between it and the tendon of the muscle, and their relations to each other; but the attachments of fasciæ, muscles, and ligaments, and the course of vessels and nerves are not to be given.

25. Describe the origin, course, and distribution of the external and internal Plantar Arteries, stating the steps of the dissection required to expose them, and describing the relative situation of the several parts successively brought into view.

26. Commencing at the integuments of the fore-part of the thigh, and carrying the dissection as far back as the anterior surface of the adductor magnus, describe the parts brought into view in dissecting the Crural Artery and its branches in its course from Poupart's ligament to the point where it passes into the ham.

27. Describe the Hip-joint, giving an account of the acetabulum and of the upper extremity of the femur, of the cartilages, synovial membrane and ligaments, and of the movements which take place in the joint, mentioning the muscles by which they are severally effected. Compare the shoulder and hip joints as regards their construction and movements.

secting the External Circumflex Artery of the Thigh, from its origin to the termination of its branches.

38. Describe the Astragalus, and the surfaces of the bones with which it is articulated. What movements take place in the ankle-joint, and in the other joints into the formation of which the Astragalus enters? And to what classes of joints do they severally belong? Describe the ligaments of these joints, and mention the structures which are in contact with them.

39. Commencing the dissection at the integuments, at the lower margin of the belly of the Gastrocnemius, and carrying it on to the heel, describe the parts successively brought into view, including the ligaments, in continuing the dissection to the posterior surfaces of the bones and interosseous ligament.

40. Give the dissection required to display the Anterior Crural Nerve, and its branches, from the point where it passes under Poupart's ligament to its termination, mentioning, in the order of their appearance, the different parts exposed in the process, and describing their relative situation; the attachments of the muscles not to be given.

41. Describe the parts successively brought into view in fully exposing by dissection the surface of the Supinator Brevis muscle.

42. Suppose an undissected thigh to be before *you, state, step by step,* the dissection which would be

required in order to expose the whole length of the Obturator Nerve in the limb.

43. Describe, step by step, the dissection necessary to expose the whole length of the Anterior Surface of the *neck* of the Femur.

MISCELLANEOUS.

1. Enumerate the joints in which either of the two forms of Interarticular Cartilages are found, and describe the use of each form of these cartilages.

2. Describe the peculiar characters of Serous and of Mucous Membranes.

3. Describe the mechanism of deglutition, in its various stages, from the mouth to the stomach.

4. Mention the organs to which the pneumogastric nerves are distributed; and describe their special function in each organ.

5. Mention examples of Muscles of the Body acting as levers of each kind, and state the reason for the large preponderance of those acting as levers of the third kind.

6. Enumerate the different kinds of moveable joints, giving examples, and mentioning the movements of which each kind admits; describe the structure of the following component parts of moveable joints, viz., Ligament, Synovial Membrane, *Articular and* Non-articular Cartilage.

7. Describe the arrangement of the Muscular Coat of the various parts of the Alimentary Canal, from the commencement of the œsophagus to the anus. Mention the purposes of its varying abundance, and different arrangement at different parts of the canal.

8. Describe the structure of the Mucous Membrane of the Stomach, and of its Glands.

9. Describe the structure and functions of the Skin.

10. Describe the origin of the Lacteals, their course and structure, and the structure and use of the Mesenteric Glands.

11. Give the structure and properties of the Mucous Membrane in general, and state briefly the chief difference which it presents in different situations.

12. Give an account of the several structures which enter into the formation of the skin, including a description of the glands, hairs, and nails.

13. Give an account of the form and structure of serous membranes in general, the nature of their secretions, and the purposes which they serve.

14. Mention the principal situations in which nervous ganglia are found. Give an account of the outward appearance and intimate structure of these bodies.

15. Give an account of the structures, physical

properties, and chemical constitution of the Elastic Tissue.

16. Give an account of the structure of the Adipose Tissue, its distribution in the body, and the purposes which it serves in the animal economy.

17. State what has been ascertained as to the structure of Lymphatic Glands.

18. What organs of the human body may be comprehended under the name of 'ductless glands'? Describe the situation, form, and internal structure of the Supra-renal body; also the source and mode of distribution of its blood-vessels and nerves.

19. Give an account of the form, structure, connections, and mode of growth of the nails.

20. Describe in their relative position the parts brought into view on removing the undermentioned muscles, viz.:—The Pectoralis Major and Deltoid; the Glutæus Maximus, the Trapezius, the Gastrocnemius, Plantaris, and Soleus.

21. Give an account of the structure and chemical composition of Articular Cartilage.

22. Give an account of the structure of a nerve (i.e., of a trunk or large branch); describing the size, mode of disposition, and microscopic characters of the nerve fibres, with the nature and arrangement of the enveloping tissues and blood-vessels. State what differences have been observed in the structure of different nerves. Discuss the question as

to the nervous nature of the grey or gelatinous fibres.

23. Give an account of the system of Lymphatic Vessels, describing their structure, and that of a Lymphatic Gland, their mode of origin, general course, and termination.

24. Give an account of the Cellular or Areolar Tissue, describing its structure, its physical and vital properties and chemical composition, the varieties which it presents in different parts, and its mode of distribution in the body.

25. Name the different varieties of Connective Tissue. How are they distinguished from each other by—(*a*) the naked eye; and (*b*) their microscopic characters?

PHYSIOLOGY.

1. State the composition of the Air we breathe, and the changes which the Air and the Blood undergo in their passage through the Lungs.

2. Describe the structure of the larger and smaller Arteries and of the Capillary Vessels, and their respective offices in circulation and nutrition.

3. Enumerate the structures which compose the Skin, and describe its functions.

4. Enumerate the different kinds of Cartilage that exist in the Human Body; describe the peculiarities of structure that distinguish each variety, and state the purposes which each answers.

5. Mention the different secretions which imbue the Food in the mouth and in the stomach during Mastication and Digestion. State the chemical composition of each secretion, and its physiological purpose.

6. Describe the structure of the Uterus; and mention the changes which take place in the organ during gestation.

7. Describe the structure of the Placenta; state the changes which the Fœtal blood undergoes by circulating in this organ, and the mode by which those changes are effected.

8. Describe the formation, composition, properties, and uses of the Epidermis.

19. Describe the steps of the dissection required to display the course of the Posterior Tibial Artery from its origin to its division into the plantar arteries, and of its branches, as far as they can be seen on the back of the leg.

20. Describe the parts (excepting the bones and ligaments) as they are successively exposed in dissecting a portion of the anterior region of the Thigh, bounded above by Poupart's ligament, and below by a transverse line corresponding with the lower limit of the insertion of the adductor brevis; the dissection to be carried down to the anterior edge of the gluteus medius, the hip-joint, obturator membrane, and anterior surface of the adductor magnus.

21. Give an account of the Popliteal region, describing its form and boundaries, and the parts contained in it, commencing the dissection at the skin, and carrying it to the bones.

22. Describe the Astragalus and Os Calcis (mentioning the surfaces of the attachment of ligaments and muscles and the grooves for the passage of the tendons), their articulations and connections with each other and with other bones, and the movements which take place in the several joints into the formation of which they enter.

23. Describe the parts situated in the plantar region of the Foot (except the bones) in the order in which they present themselves on dissection.

24. State the dissection required to expose the

Peroneus Longus in its whole course from its origin to its insertion, mentioning its relations to other parts. In the dissection of the sole of the foot commence at the skin, and mention, in the order in which they are seen, all the parts which intervene between it and the tendon of the muscle, and their relations to each other; but the attachments of fasciæ, muscles, and ligaments, and the course of vessels and nerves are not to be given.

25. Describe the origin, course, and distribution of the external and internal Plantar Arteries, stating the steps of the dissection required to expose them, and describing the relative situation of the several parts successively brought into view.

26. Commencing at the integuments of the forepart of the thigh, and carrying the dissection as far back as the anterior surface of the adductor magnus, describe the parts brought into view in dissecting the Crural Artery and its branches in its course from Poupart's ligament to the point where it passes into the ham.

27. Describe the Hip-joint, giving an account of the acetabulum and of the upper extremity of the femur, of the cartilages, synovial membrane and ligaments, and of the movements which take place in the joint, mentioning the muscles by which they are severally effected. Compare the shoulder and hip joints as regards their construction and movements.

parts of the organ of Smell. Analyse the action of smelling at an odorous body.

29. Give a general description of the various modes by which Reproduction is effected in the Animal Kingdom.

30. State what you know respecting any experiments which illustrate the influence of the Nervous System upon the process of Secretion.

31. Suppose one of the higher animals so confined that it is compelled to breathe over and over again a given quantity of air; describe in detail the effects (1) upon the animal, (2) upon the air.

32. What is the Chemical Composition of the Blood; its reaction, specific gravity, and ordinary quantity? Explain the purpose served by each of its constituents.

33. Mention the different forces by which the circulation of the blood is carried on, the uses of the valves of the heart, and the number of its pulsations at the different periods of life.

34. State the purpose of respiration, the chemical and physical changes the blood undergoes in the lungs, and the effect of air rendered impure by respiration and by effluvia from decomposing vegetable and animal matters.

35. Classify the cranial nerves according to their functions.

36. Explain briefly the modern pathology of inflammation.

37. Explain the functions of the three branches constituting the eight pairs of Cranial Nerves.

38. Give the composition of Bile. The function of the Liver as an assimilating and excreting organ. The test for distinguishing *suppression* or non-elimination from *obstruction* of secreted but retained bile.

39. State what is known of the deviations from normal Blood constituting the tubercular crasis and its chief causes.

40. Describe the form, size, and structure of nerve-cells, and their varieties. What is most generally understood to be their relation to the nerve-fibres? Describe also the microscopic characters of the different kinds of nerve-fibres, and the special structures connected with their extremities in certain parts of the skin and mucous membranes.

41. Describe the acts of deglutition and vomiting, and explain the mode in which the muscles cooperate in these processes. What nerves are concerned in deglutition, and how do they severally contribute to the effect?

42. In what manner does the *velocity* of the blood's motion differ in different parts of the sanguiferous system, and to what causes is the difference to be ascribed? What is the actual velocity in the carotid artery and in the capillaries respectively? What time is required for a complete circuit, and by what means are these points ascertained?

43. Describe the phenomena of the heart's motion; and state what seems to be the most probable explanation of the impulse and sounds to which it gives rise.

44. On what evidence, derived from observation or experiment, can it be shown that the motions of the heart are excited, regulated, or otherwise influenced through the nervous system? And in what way is such influence exerted?

45. What is the average quantity of urine discharged by a healthy man in twenty-four hours? Whence is it supposed to be derived? And how is the quantity modified by food, exercise, and other circumstances?

46. Give an account of the structure of the ovary and ovum in a mammiferous animal; and describe the series of changes which ensue in the mammalian ovum in consequence of impregnation, from the time it leaves the ovary up to the period when the first trace of the embryo appears. State also the changes which take place in the Graafian follicle from which the ovum has been discharged.

47. Give an account of the deciduous membrane, the chorion, and the amnion (with its fluid), including their structure and uses, their mode of formation, and the changes they undergo in the progress of pregnancy.

48. What amount of Refraction do the transparent media of the eye respectively cause in bring-

ing the visual rays to a focus, and how are the effects of spherical aberration obviated? Explain how the eye becomes enabled to see objects at different distances, and give examples of special arrangements for this purpose met with in the eyes of Birds and Fishes.

49. Define the physiological differences between the Motor, Sensitive, and Excito-motor Nerves. Give a few examples of reflex motor action.

50. Give an account of the Blastoderm, or germinal membrane, in the ovum, and state the opinions of modern physiologists relative to the original formation of the animal tissues.

51. What is the intimate composition of the Ganglionic system of Nerves? State the distinctive properties of organic nervous matter. In what structures is its presence to be detected, and what are its functions in the animal economy?

52. Describe the minute structure of the fibre of voluntary muscle, and its condition, as shown by the microscope, when in the opposite states of contraction and relaxation.

53. What influence do the Nerves exert over the Digestive Functions of the Stomach, and in what respects does artificial digestion differ in its results from that effected in the living animal?

54. By what means have fluids and saline solutions been supposed to pass into the circulating fluids *in order to explain* the rapid appearance of certain

odorous substances and chemical re-agents in the urine and other secretions? What is the most probable explanation of the phenomenon?

55. Describe the Duodenum, more particularly with reference to the minute structure and functions of its different coats; the nature of the secretions which are poured into the intestinal canal at this part, and their influence on the process of digestion.

56. State the properties of Chyle, and point out the difference between the composition of that fluid and of the blood.

57. Describe the Urinary Secretion, its origin, chemical composition, and importance in the animal economy.

58. Give a brief account of the Sympathetic system of Nerves, and define the functions over which it presides. What is its general arrangement in the different classes of Vertebrate Animals, and how is it represented among the Invertebrata?

59. What is the source of Fat, and what are its uses in the human economy?

60. Describe the Circulation of the Blood through the capillaries at the periphery of the body, and the agencies by which it is sustained.

61. Give an account of the action of the Heart, and its effect in aiding the circulation of the blood. Likewise compare the Human heart with that of a Bird, a Reptile, and a Fish.

62. Describe the minute structure of Bone, its *mode of formation,* and vital properties.

63. Describe Muscular Fibre, its physical structure both in the voluntary and involuntary muscles, and the influence of the nerves on muscular contraction.

64. What are the principal theories relative to the source of Animal Heat?

65. Describe the Skin, and the importance of its secretions in the human economy.

66. Give an account of the arrangement, intimate structure and chemical composition of the several constituent tissues of the Teeth.

67. What are the principal components of the Blood in Vertebrate Animals, their respective characters, properties, and uses in the economy, their chief diversities in the several classes of this sub-kingdom, and their properties in the healthy Human system?

68. State the essential nature of the *Respiratory* process; the purpose which it answers in the economy; the causes which ordinarily render its continuance essential to life; the circumstances under which it may be temporarily suspended without injury to the system; and the changes which it normally produces in the Blood and in the Air respectively.

69. Describe the structure and actions of a *Gland*, according to modern views; trace the gradual development of the *Liver* through the principal *series of* Invertebrated Animals; describe the

chief varieties presented by the structure of the *Kidney* in the different classes of Vertebrata; and give an account of the chief components of the urinary secretion, and of their respective sources.

70. Upon what Chemical process is the maintenance of *Animal Heat* chiefly dependent? how is this maintained in the bodies of Man and of the Carnivorous and Herbivorous Animals respectively? and what are its relations to the presence of Fat in the Animal body?

71. Describe the apparatus by which the *Embryo* obtains its nourishment from the contents of the *Ovum* in Oviparous Vertebrata; the provisions for the aëration of its blood; and the manner in which these are combined in the Placenta of Mammalia.

72. Give an account of the minute structure of the *Striated Muscular Fibre*, and of its vital endowments; and point out how far these correspond with the properties of the contractile tissues of plants.

73. Describe the *Respiratory Apparatus* of the Human Skin; the nature, amount, and uses of its secretion; and the circumstances under which this is liable to variation.

74. Describe the functions of the three Nerves commonly grouped together under the name of the Eighth Pair, and of their several branches; as determined by their anatomical distribution, and by *experimental inquiry.*

75. What are the *physical* and vital endowments of the middle coats of Arteries; and how do these modify the passage of the blood through the arterial system?

76. Describe the component structures of *Human Teeth.*

77. What are the sources of the *Demand for Aliment* in the human body; and what are the principal conditions by which that demand is regulated? Enumerate the principal classes of *Alimentary Materials;* state the purposes to which they are severally subservient in the economy; mention the chief proximate components of bread, meat, potatoes, milk, rice, and arrowroot, and state the quantity of food ordinarily requisite to maintain the human system in vigorous action.

78. Explain the dependence of the *Respiratory Movements* upon the Nervous System; describe the position of the respiratory ganglia in Articulata, Mollusca, and Vertebrata; give the rationale of the ordinary and extraordinary movements of respiration in Man; and mention what nerves are concerned in each.

79. Describe the principal stages of the *Development of the Nervous Centres* in the Human Fœtus; and state how far these correspond with the permanent forms of those organs in the lower animals.

80. Give an account of the minute and chemical structure of *Bone*; describe the mode of its first

formation and subsequent increase; and state the chief diversities which it presents in the different classes of Animals.

81. State what you consider to be the functions of the Cerebellum; and give the grounds for your belief.

82. What are the probable functions of the Absorbent System, as inferred from its structure, its distribution, and its comparative anatomy, as well as from experimental investigation?

83. What portions of the fully formed Human organism are composed of *simple cells*? and to what functions are they respectively subservient?

84. What do you consider to be the degree of dependence of Nutrition and Secretion upon the Nervous System? and what are the grounds of your belief?

85. What appear to be the relative functions of the Absorbent and Sanguiferous vessels in the *Absorption* of nutritive and other substances from the alimentary canal? what difference exists in this respect between Vertebrated and Invertebrated Animals? and how far may the act of Absorption be explained on physical principles?

86. Give an account of the mode in which Vital Action is influenced by Heat, illustrating it by examples drawn from cold-blooded animals, and from warm-blooded animals in the states of hybernation and starvation.

87. What are the principal functions of the Spinal Cord (including the Medulla Oblongata) of Vertebrated Animals; and what parts of the Nervous System of Articulata and Mollusca are its equivalents?

88. Describe the principal phases in the development of the *Circulating System* of the Mammalian Fœtus, from the first appearance of blood-vessels in the ovum to the time of birth, and state how far these may be regarded as corresponding with the permanent conditions of the vascular system in the lower classes of Animals.

89. In what way is the *Circulation* of the blood affected by suspension of the Respiratory process in a warm-blooded animal, and what is the immediate cause of death if that suspension be continued?

90. In what manner are *Vocal Sounds* produced in the Larynx? Upon what acoustic principles may their production be explained? and in what way are they modified by the actions of the several muscles which form part of the laryngeal apparatus?

91. What is the normal composition of the *Urine* in Man? what are the probable sources of each of its principal components, and how far are their respective proportions liable to be influenced by mental or bodily exertion? what reason is there to suppose that these components pre-exist in the blood, and what are the consequences of an entire suspension of their elimination?

92. In what does the process of *Digestion* essentially consist? what share in it is performed by the Salivary, Gastric, Pancreatic, and Hepatic Secretions respectively? and what are the results of its operation upon different kinds of alimentary material?

93. What are the nerves concerned in the act of *Deglutition*? and what are the inferences you might draw from the circumstances under which that act may be performed (as shown in states of disease, and by experimental enquiries) with regard to the nature of Reflex Action in general?

94. What is the nature of the *Muscular Sense*, and what share does it take in the performance of Voluntary Movements?

95. Describe the successive modes in which the *Human Fœtus* derives nourishment from its parent; and mention at what stages in the evolution of this plan it is checked in Fishes, Reptiles, Birds, and the inferior Mammalia.

96. Show the dependence of all *Vital Action* upon *Heat*, by examples drawn from the different classes of Animals; and give an account of the chief provisions which are met with for its constant or occasional development in the living body.

97. Give a general account of the process of *Respiration* as performed in the Human subject, specifying the minute structure of the air-cells of the Lungs, and of their capillary network; the

mechanism by which the air contained in them is continually renewed; the parts of the nervous system by whose action the movements are sustained; the average quantity of air that passes through the lungs per minute; and the nature and amount of the changes of composition effected in it by the respiratory process.

98. Describe the structure of the *Electric Organs* in the Fishes which possess them; and enumerate the principal phenomena of their action, pointing out the dependence of these upon nervous agency.

99. Give an account of the Microscopical characters of the different forms of *Nervous Tissue*, and of its chemical composition; state what may be probably regarded as their respective functions, and how far these are dependent upon oxygenated blood; and point out the relations between Nerve-force and Electricity.

100. Give a general account of the history of the Development of the *Human Teeth*, both of the temporary and permanent series; point out the analogies between its successive stages and the modes of dentition of the lower Vertebrata, and describe the organic structure and chemical composition of the Dentine, Enamel, and Cementum.

101. Describe the principal forms under which the *Liver* and *Pancreas* present themselves in the animal series; and state what, according to recent

investigations, may be considered as their respective offices in the operations of Digestion and Assimilation.

102. Describe the movements of the *Alimentary Canal* in Man, from its commencement to its termination; and point out how far these are dependent on the Nervous System, or are influenced by it, and how far the Mind participates in them.

103. Describe the structure, chemical composition, properties, and mode of development and repair of the *White* and *Yellow Fibrous Tissues*; and give an account of their general distribution in the Human Body, as well as of the functions to which they are respectively subservient.

104. Enumerate the actions of the different Muscles of the *Human Larynx*, and show how these are employed in the production of Vocal Sounds and in the regulation of the respiratory movements; and state what are the respective functions of the nerves by which they are supplied as determined by the results of their action.

105. Describe the minute structure and chemical composition of Cartilage; its principal varieties; state what is known of its mode of development, growth, and reparation; and point out the bearing of these facts on the general doctrines of Nutrition, as regards (1) the independent formative power of individual parts, (2) the relation of the tissues to

blood-vessels, and (3) the necessity or otherwise of nervous influence for the formative operations.

106. What are the sources of demand for the Excretory operations generally? what are the effects of their suspension? and what special part does each take in freeing the system from injurious matters, either formed within itself, or introduced by it?

107. In what modes is the *Absorption* of Nutrient Materials effected in Man and other Vertebrata; and what representations of these processes are found in Invertebrated animals? Describe the composition and properties of Chyle, with relation to those of Lymph and Blood; and trace its course from the Intestinal Villi to the Heart. And explain how *other* soluble substances contained in the Alimentary Canal find their way into the circulation.

108. What are the sources of the Excretion of Carbonic Acid from the Lungs? how far may this process be accounted for on physical principles? and what are the essential provisions for effecting it? What may be considered as its average daily amount in man; and what are the principal circumstances which tend to modify it?

109. What is the normal *Temperature* of the Human Body? Describe the means by which it is sustained, and prevented from being unduly elevated; and show, from the physiological history of Cold-blooded Animals, and of Hybernating

Mammalia, the relation between Heat and Vital Activity.

110. Describe the structure of the walls of *arteries*, show how the current of Blood is modified in its passage through them, and explain the nature of the *Pulse*.

111. Describe the constituent parts of the *Mammalian Ovum*; enumerate the principal changes which it undergoes in the course of its evolution, maturation, and discharge from the ovarium; explain the mode in which the 'mulberry mass' is formed after fecundation; and state what changes take place within the Graafian follicle, after the expulsion of the ovum.

112. To what extent are the Several Organic Functions — Digestion, Sanguification, Circulation, Respiration, Nutrition, Secretion, and Reproduction —*dependent upon* the Nervous System? How are they *influenced by* it? And with what parts of it are these relations the most positive and intimate?

113. What are the phenomena of Death by *Starvation*, and what is its immediate cause, as shown by the experiments of Chossât?

114. Describe the general distribution of the *Pneumogastric* Nerve, and the functional endowments of its principal branches, stating the results of the experiments made to determine these.

115. Describe the two principal kinds of *Muscular Fibre; state in what* parts of the Human body they

are respectively found; and give an account of their vital endowments, and of the conditions under which these manifest themselves.

116. What are the principal components of the Blood, and from what sources are these derived? in what proportions do they ordinarily present themselves in Man? and what may be presumed to be their respective uses in his economy?

117. Describe the normal action of the Heart, the sounds which it produces, and their causes; state how far you consider this action to be dependent upon Nervous Agency; and mention the principal conditions which have been found to affect its rate.

118. In what modes do the action of the *Spinal* Cord (including the Medulla Oblongata) take part in the performance of the Organic Functions?

119. Give an account of the structure of the Human *Placenta*, its functions, and the mode of its formation; and state in what way its place is supplied in the Implacental Mammalia. Describe the course of the Circulation in the *Human Fœtus*, and state how far this has its parallel in the adult condition of any other animal.

120. Give an account of the *Coagulation of the Blood*, and of the conditions on which it depends; mention the principal circumstances which affect the completeness of the process and the period of its *occurrence*, and state the results of excessive and

deficient coagulability, as regards the system at large.

121. Describe *Ciliary Movement*; mention the parts of the body of man on which it occurs, and the purposes which it serves in his economy, and give a general account of its distribution and offices among the lower animals.

122. In what Tissues of the body do the *Disintegrating* processes seem to take place most rapidly? what are the conditions which promote or retard their activity? how are their results eliminated through the several excretory organs; and what are the consequences of any check to such elimination?

123. Describe the Secreting apparatus of the *Skin*, and the respective functions of its different glandulæ, and state the purpose of the *Cutaneous Exhalation* in the general economy, with the principal conditions of its variation.

124. What are the *Nerves* by which the *Tongue* is supplied; and what may probably be inferred from their distribution, from experiment, and from pathological observation, as to their respective functions? Describe the structure, and the probable uses, of the different kinds of *Lingual Papillæ* in Man and other animals.

125. Describe the several *Motions of the Eyeball*, and the actions of the several Muscles by which they *are performed; state* how far they are, and how far

they are not, under the immediate control of the *Will*, and describe the influence of *guiding sensations* in their production and direction; and point out in what respects they accord, and in what they differ, from ordinary Volitional movements.

126. Describe the first formation of the *Sanguiferous System* in the *Human Fœtus*, and the principal changes which it undergoes, up to the establishment of the pulmonary respiration.

127. Enumerate the Principal Constituents of the *Urine* of Man; the amounts in which they are ordinarily found, and the chief conditions of variation in their respective proportions: and state what appears to be the source of each, in the components of the food, or in the metamorphic actions of the economy.

128. Describe the comparative development of the *Lacteal* system in the *Animal* series; explain what part it takes in *Absorption*, as compared with the sanguiferous system; and compare the nature and composition of Chyle with those of Lymph and Blood.

129. To what actions within the body does the *Oxygen* introduced by the Respiratory process ordinarily become subservient; and what are the effects of a prolonged deficiency of oxygenation upon the composition of the Urine?

130. Describe the form, movements, and development of the *Spermatozoa*; and state the grounds for attributing to them the essential part of the act of *Fecundation.*

131. Describe the origin and general distribution of the *Fifth Pair* of cranial *Nerves*, with the attributes of its principal subdivisions; and state the effects of the intracranial section of its trunk.

132. Describe the minute structure of the Spleen; the principal diversities it presents among different animals; the peculiarities of splenic blood under various circumstances; and the inferences as to the function of the organ which you would base on these facts.

133. Give an account of the Red Corpuscles of the Blood, describing their figure, size, structure, and chemical nature, with the chief differences they present in different vertebrated animals; state also what is the average proportion of red corpuscles in Human blood, and what variations are observed according to age, sex, and other circumstances.

134. Describe the secreting structure of the Liver; give an account of the composition and uses of the Bile; and state what is known of the changes produced in the composition of the Blood during its passage through the portal circulation.

135. Describe the origin and development of the Allantois; state what is its office in the embryonic development of the Bird; and explain the part which it takes in the formation of the Placenta in the Mammal.

136. Describe the structure of the Medulla Oblongata, its connection with other parts of the

Encephalon and with the Spinal Cord, and the mode of origin of the several nerves attached to it. What is the present state of our knowledge of the functions of its several constituent parts?

137. What is the essential condition of Fecundation? what are the steps in the process of development of the embryo throughout the Animal Kingdom?

138. Describe the ultimate structure of the Human Lung; explain the mechanism of Inspiration and Expiration; and give an account of the physical process by which the exchange of gaseous constituents between the blood and the atmosphere is effected.

139. What is the structure of the different kinds of Contractile Tissue? State the arguments for and against the existence of a *vis insitu*, or inherent contractile power in muscle.

140. Describe the structure of the Human Ovary and Ovum, and give an account of the process of Menstruation.

141. Give an account of the process of Ossification, and describe the structure of fully-formed bone.

142. What is the structure of Human Hair, and how is it developed?

143. Describe the structure and offices of the Wolffian bodies, and explain their relations to the genital organs.

144. Describe the leading features in the development of the Vertebrate embryo; explaining the mode

of origin of the Umbilical vesicle, the Amnion, the Allantois, and the Placenta. What are the 'primitive groove' and the 'chorda dorsalis,' and by what embryological states are spina bifida and hare lip explicable?

145. Give an account of the structure and development of the Spermatozoa in Man. State what is the essential nature of the process of Fecundation, giving the evidence on which your conclusions are based. What animals have motionless spermatozoa.

146. What is the structure of the human Kidney, and what are the proportions of the various constituents of the normal urine?

147. Describe the structure of the organs of Smell in Man, noting the peculiarities of the olfactory nerve, and explaining the mechanism by which odorous particles are brought into contact with the Schneiderian membrane.

148. Describe the development of the Human Brain.

149. What animals have, occasionally or permanently, a temperature higher than that of the medium in which they live? What are the sources of Heat in the animal economy, and on what conditions does the temperature of any given part of the Human body depend?

150. Describe the structure of all the glands which are connected with the alimentary canal of Man, ex-

cept the Salivary, Hepatic, and Pancreatic; and give an account of the known or supposed functions of each.

151. Classify the proximate constitutents of a piece of bread under the two heads of 'nutritious' and 'non-nutritious.' Suppose the piece of bread to be eaten, and trace out the changes it undergoes in its passage from one end of the alimentary canal to the other.

152. Describe the origin, the structure, and the functions of the Human Placenta; and state in what groups of animals the young are connected with the parent by a placenta, or at least by an organ having a similar function.

153. In which of the lower animals are there no capillaries, the arteries and veins being united by 'lacunæ' or by the general cavity of the body?

154. By what experiments can it be shown that the state (as regards contraction or dilatation) of the arteries is greatly dependent on nervous influence? How does the state of the arteries affect the blood contained in them, and in the capillaries which they supply?

155. Give the number, kinds, order of succession, and mode of development of the Teeth in Man. To what teeth in Man do the tusks of the Elephant and those of the Boar correspond respectively?

156. What are the *corpuscula tactus*? What functions have been ascribed to them, and how may

the delicacy of the sense of touch in different parts of the body be estimated?

157. Describe the minute structure and the functions (so far as they have been ascertained by trustworthy experiments) of the Spinal Cord and Medulla Oblongata.

158. Describe the development of the Mammalian Skull and Face; and point out what adult vertebrate crania present a certain resemblance to various stages of the Mammalian Skull.

159. Give an account of the mode of development of the male and female genitalia, and the descent of the Testis.

160. Describe and contrast the structure and modes of development of ordinary Bone, of Dentine, of Enamel, and of Crustacian and Molluscan shell.

161. What is the minute structure of the trachea, bronchi, and pulmonary cells?

162. What is the structure of the Human Tongue, and on what evidence does the received views as to the functions of its nerves rest?

163. What is Connective Tissue? Describe the structure, behaviour with reagents, and the chemical constitution of what you consider to be a typical example of that tissue. Then point out the principal modifications which it undergoes, the localities in which it occurs, and the purposes which it subserves.

164. Give an account of the histological structure *of the Heart, its* movements, and the mechanical im-

port of its different parts in the adult, and describe the changes which it undergoes in the fœtus.

165. Describe the process of Digestion and of the absorption of its products, in the case of—1, Wheaten bread; 2, Meat; 3, Milk.

166. Describe the physical and chemical characters of the Blood in Man, and the changes it undergoes when removed from the course of circulation, both within and without the body; and state the conditions by which its coagulation is affected in either case respectively.

167. Describe the structure of the 'Ovum' in the Bird and Mammal; and the essential conditions of impregnation.

168. Describe the act of rumination, and the principal modifications in the structure of the digestive organs presented in the class Ruminantia.

169. Describe the structure and functions of the Spinal Cord (not including the Medulla Oblongata); and state what has been determined experimentally with regard to the transmission of sensory and motor impressions through it.

170. State the differences which exist in the functions of the Submaxillary and Parotid Glands in Man and other Mammalia, and the result of recent researches respecting the innervation of those two organs.

171. Point out the essential conditions upon which the maintenance of the irritability in nerves

depends; and mention experiments proving certain conditions to be indispensable. Also, describe the changes which take place in the peripheral and central portions of a divided nerve, a short time after its division.

172. Describe and account for the various caloptric phenomena exhibited in the Human Eye; and the differences observed in some of these phenomena when the Eye is adjusted to distant and to near vision.

173. Describe the structure and presumed functions of the ductless glands in the Human subject.

174. Describe the method of determining the amount of Blood-pressure in an animal, and the precautions necessary to be employed in making the experiment.

175. State the facts which negative the idea that the intellect is especially connected with the anterior lobes of the Brain.

176. Where is the sense of Taste most developed? Describe the structures necessary for its manifestation, and state what are the nerves which supply them.

177. Enumerate the effects (*a*) of cutting and (*b*) of stimulating the Sympathetic in the Neck, on (1) the Iris, (2) the Blood-vessels, and (3) the Temperature; and state what conclusions regarding the functions of this system of nerves may be drawn *from these experiments.*

178. Explain physiologically how a tumour in the Neck may cause loss of voice, and how a small foreign body in the Larynx may cause great dyspnœa.

179. What changes occur in an ovum from the time of impregnation up to and inclusive of that of the formation of the three embryonal sacs?

180. Describe briefly the phenomenon of the coagulation of the Blood. Mention any causes which prevent, retard, or accelerate the coagulation of the Blood. Answer the latter part of the question under the following heads:—(1) Temperature; (2) Motion; (3) Addition of water; and (4) Action of chemical substances.

181. What are the conditions of healthy nutrition with respect to (1) the Blood; (2) the Tissues; and (3) the Nervous System? Give one or two illustrations of the effects of different modifications of these conditions.

182. Describe the structure of the Crystalline Lens. Explain the manner in which the Eye is 'accommodated' for the vision of near and of distant objects. What are the effects of Calabar bean and Belladonna upon 'accommodation,' and how are these effects explained?

183. State by what facts or experiments the following phenomena of the Nervous System may be demonstrated:—

a. The motor and sensory properties of Nerves.

b. The direct influence of the Nervous System on the Heart and vessels.

c. The reflex action of the Spinal Cord.

184. Describe the form, movements, and development of the Spermatozoids, and their function in the act of fecundation.

BOTANY.

1. Define the terms Inferior, Loculicidus, Corolla, Folliculus, Placenta, Spatha.

2. Give such diagnoses of the following Orders as may be sufficient to include our British genera :—Linæ, Compositæ, Labiatæ, Aroideæ.

3. Give such diagnoses of the following Genera as will include our British species, alluding also to such of the more important or prominent peculiarities in the flower, fruit and seed as you may happen to remember :—Helleborus, Apium, Convolvulus, Salix, Carex.

4. Define the terms Radix, Ligula, Digitatus, Perianthium.

5. What are the chief modifications of the Stem?

6. Describe the difference between a true and false Arillus, stating examples.

7. State the more prominent theories that have been proposed for explaining the formation and development of Cells.

8. What are the chief modifications of structure in the flowers of Leguminous plants?

9. Describe the function of 'exhalation.'

10. Define the terms Endocarpium, Pericarpium, Papilionaceus, Diadelphus, Parenchyma, Vernatio.

11. Give such diagnoses of the following Orders

as may be sufficient to include our British genera:—Umbelliferæ, Scrophularinæ, Cucurbitaceæ, Colchicaceæ, Gramineæ.

12. Give such diagnoses of the following Genera as will include our British species:—Hyoscyamus, Vicia, Primula, Arum, Tris.

13. Define the terms Carpella, Commissura, Raphe, Distichus, Thyrsus.

14. What are the chief adventitious inorganic constituents found in plants? naming a few examples in which one or other of them are peculiarly abundant.

15. What are the conditions essential to germination of seeds?

16. State some of the most remarkable phenomena attributed to the peculiar irritability manifested in some plants.

17. Define the terms Didynamus, Cyme, Valva, Carpella, Arillus, Capsula.

18. Define the terms named in Questions 1 to 6:

1. *Glans.* What are its modifications in Quercus, Castanea, and Corylus?
2. *Testa.* Mention good examples in which it is bony, crustaceous, and membranous, respectively.
3. *Lodicula.* How many are found in Triticum, Anthoxanthum, and Stipa?
4. *Umbella.* The modifications in Umbelliferæ.

5. *Pappus.* Why sessile in some, why stipitate in other species of Compositæ?
6. *Dissepimentum.* Distinguish between a true and a false; and give three good examples of the latter, selected from different orders.

19. State the different origin of Tendrils, and name examples of each kind.

20. What is the relative position of Hile and Mycropyle in Vicia, Quercus, Taxus, Ranunculus, and Lychnis? Give the corresponding Inversions of their Embryos.

21. Give examples of plants in which a milky Latex is wholesome, and of plants in which it is deleterious.

22. Trace the changes which take place in an Ovule immediately after it has been fertilised, up to the perfecting of the Embryo.

23. Describe Cambium; state the place it occupies and the office it performs.

24. State what is known of the movement of fluids in the interior of plants, both partial and general.

25. What is the cause of the ascent of sap?

26. Describe the substance called Cellulose, and state the place which it occupies in the Vegetable structure.

27. Describe the phenomena of germination in *Dicotyledons* and Monocotyledons.

28. State the distinctions between Angiosperms, Gymnosperms, and Monocotyledons.

29. What is the derivation and what the meaning of the following terms:—Monœcia, Trigynia, Polygamia, Syngenesia, Ochrea, and Anatropus?

30. What are Raphides, structurally and chemically?

31. Explain the nature of the pollen-masses in the Asclepiadea.

32. What is the Hair of a Plant; what are its functions and its principal modifications; and how far are these modifications characteristic of Natural Orders?

33. Explain the nature of the pits or depressions, or so-called 'pores,' in the tissues of Plants.

34. By what reagents can nitrogenised tissues be most readily distinguished from non-nitrogenised?

35. In what manner are Stomata formed?

36. What are the principal modifications in the structure of the column and anther of British *Orchidaceæ*?

37. Describe the development of any Ovule, and the changes it undergoes up to the time when the embryo is first discoverable.

38. On what principle is the anther of *Viscum* reconcileable with the theory usually recognised as explaining the origin of stamens?

39. Describe the alburnum of an Exogen, its *origin, its use, and* the changes it undergoes.

40. How is the parietal placentation of Orobanche to be reconciled theoretically with the placentation of Scrophularineæ?

41. Describe the phenomena of impregnation in Ferns.

42. Describe the structure of the Fructification in the following Natural Orders; point out what is abnormal, and state their relation to other Natural Orders:—

1. Corylaceæ.
2. Coniferæ.
3. Nymphæaceæ.
4. Butomaceæ.

43. Describe the Reproductive Organs of *Hepaticæ*, and point out the difference between those of Jungermannea and those of Marchantia.

44. What analogy is there between the Reproductive Organs of Mosses and those of Algæ?

45. Describe the processes of Root-formation and Development in Phænogamous plants. Explain the various forms assumed by this organ; and state the circumstances under which roots originate on aërial organs.

46. Describe the differences between the genera Conium, Æthusa, Ferula, and Coriandrum.

47. Define the terms Dichotomus, Achenium, Bulbus, Lenticella, Hilum, Etiolatus.

48. Define the following terms:—

1. *Cormus.* How is this distinguished from a Bulbus tunicatus?
2. *Antitropus.* Name two British Orders in which this term would exclusively be applicable to the part it is employed to characterise.
3. *Endocarpium.* How is it characterised in a Drupa?
4. *Dissepimentum.* How is a true distinguishable from a false one?
5. *Capitulum.* What are its principal modifications in Compositæ?
6. *Pericarpium.* Distinguish between that of a Pæonia and a Colutæa.

49. The term Receptaculum is of general application. Name any of the technical terms employed to give it a special significance.

50. Trace the development of a Common Bean from its embryo state to the perfecting of its seed.

51. Explain how Starch is naturally, and may be artificially, converted into sugar.

52. Account for the progress of water imbibed by the extremity of the root-fibres through a tree into its leaves.

53. In what respect are the number and proportionate lengths of the Stamens modified by Labiatæ and in Scrophulariaceæ?

54. Describe *Aconitum Napellus*, common Monks-[illegible]: *(1) Root—its* form and mode of increase.

(2) Leaves—their form. (3) Inflorescence. (4) Calyx—number of sepals, their form and colour. (5) Corollaform of petals. (6) Stamens--number and insertion. (7) Pistil—form, number of carpels. (8) Fruit—mode of dehiscence. (9) Medicinal qualities of the plant. (10) Natural Order to which the plant belongs.

55. Describe Pollen :—(1) Its usual forms; (2) its coverings; (3) its tubes, their origin and formation. Describe an ovule :—(1) its form; (2) its coverings; (3) entrance of pollen; (4) germ vesicles; (5) formation of embryo; (6) position of embryo in fully developed ovule; (7) parts of the embryo and their relation to the ovular coverings.

56. Explain the following terms and give an example of each :—(1) Apocarpocis. (2) Epigynous. (3) Anatropal. (4) Gymnospermous. (5) Calycifloral. (6) Cyme. (7) Triadelphous. (8) Spore. (9) Corymb. (10) Æstivation.

57. Describe the fruit of the Spanish Chestnut, the Mahogany Tree, the Ash, the Scotch Fir, the Campanula, the Primrose.

58. Mention the peculiarities in the stamens and pistils of the genus Primula, and describe the mode in which ovules are fertilised in the species of that genus.

59. Explain the terms Ascidium, Corollifloræ, Peristome, Rhizome, Zoospore, Gynandrous.

60. Dicotyledon, with gamopetalous irregular corolla, dimerous symmetry, and bicarpellary superior capsule. Give the Natural Sub-class and Order.

61. Describe the fruit of the Yew, Cypress, and Juniper.

62. Define the terms Alburnum, Parietalis, Anatropus, Lenticella, Ligula, Circinatus.

63. Define and illustrate the terms in Questions 1 to 6:—

1. *Thyrsus.* Of what form is this a modification? State a good example.
2. *Tetradynamus.* To what Order is this term restricted? Is it applicable to every species of such Order? If not, state exceptions.
3. *Raphides.* In what Orders are they prevalent? Of what materials are some of them composed?
4. *Connectivum.* Describe its peculiar character in Salvia.
5. *Caryopsis.* Distinguish this from Achenium.
6. *Raphe.* State an example in which it is conspicuous.

64. What are the chief peculiarities of Coniferæ, both in regard to the structure of the stem and the flower?

65. Give the theory of Placentation, and nam examples illustrating its principal modifications.

66. State the composition of Vegetable Oils ar

Tallows, and explain the processes by which their proximate principles may be separated. From what plants are they mainly derived for commercial purposes?

67. Explain the process of nutrition in the great majority of leafy Dicotyledons; and state in what particulars it essentially differs in all Fungi.

68. If we regard a Corollifloral Dicotyledon as usually characterised by a hypogynous monopetalous Corolla, are you acquainted with exceptional cases in any Order which you would nevertheless unhesitatingly refer to such a group?

69. Describe the Inflorescence of the Scotch Fir and the Hop.

70. Describe the organs of Reproduction in the Natural Order Coniferæ, and describe the Embryogenic process in the plants of the Order.

71. Give the Botanical characters of Palms as regards—(1) Stem. (2) Leaves and their Appendages. (3) Inflorescence. (4) Flowers, including Perianth and essential Organs of Reproduction. (5) Fruit. (6) Seed and Embryo.

72. Refer each of the following plants to its Natural Order, and mention the Genus and Species in each case:—(1) Juniper. (2) Jerusalem Artichoke. (3) Celery. (4) Potato. (5) Parsnip. (6) Stavesacre. (7) Colocynth. (8) Hazel. (9) Celandine. (10) Chestnut.

73. Describe the seven kinds of fruit found in

the Natural Order Rosaceæ, and give an example of each of them.

74. Describe fully the fertilisation of Orchids, and give the characters of their Andrœcium and Gynœcium, with their Morphology.

75. Describe the usual mode of Fertilisation and Reproduction in Confervæ.

76. Describe the organs of Reproduction in the Natural Order Filices.

77. Thalamifloral Dicotyledon, with spiked irregular flowers, dimerous symmetry, caducous sepals, slightly coherent petals, six slightly coherent stamens, fruit a follicle. Give the Natural Order.

78. Give the characters of the fruit of the following plants:—Maple. Geranium. Wood-Sorrel. Saxifrage. Cucumber. Valerian. Poplar.

79. Describe the stigmatic body in Vinca and Sarracenia.

80. Give the distinction between the Genera Erica Calluna, and Epacris.

81. Refer the following plants to their Classes, Sub-classes, Sections (if any), and Natural Orders:—Juniper, Cayenne Pepper, Chamomile, Cresses, Senna, Parsley, Auricula, Carnation, Assafœtida, Garlic.

82. Describe a Biparous and a Uniparous Cyme, and give an example of each.

83. Describe the fruit of each of the following

plants :—Elm, Banna, Cinchona, Cathartocarpus (Cassia) Fistula, Clematis, Zea Mais (Indian Corn), Campanula, Ipecacuanha.

84. Refer the following plants to their natural Orders :—Tamarind, Cotton, Quince, Indigo, Castor Oil, Chestnut.

85. Polypetalous Dicotyledon, with superior calyx, pentapetalous corolla, fleshy concave receptacle fruit achenes. Give the Natural Sub-class, Section, Order, and Sub-order.

86. Describe the stamens of Violet, Cucumber, Euphorbia, Salvia, and Mallow.

87. Describe the development of the Anther and its contents, the structure of its coverings, and the differentiation of its parts.

88. Describe the formation of a Free Central Placenta, and mention four plants belonging to the four different Natural Orders in which this kind of placenta is seen.

89. Describe the Florets in the capitulum of *Centaurea Cyanus* (Corn Bluebottle) and those in the head of a species of Scabiosa.

90. Separate the Trefoil (*Trifolium*) from the Medick (*Medicago*) by the form of the fruit.

91. Describe the organs of Reproduction, and the mode of Fertilisation in Hepaticæ (Liverworts) and Characeæ.

92. Refer the following plants to their Natural

Orders:—Liquorice, Capsicum, Fuchsia, Parsnip, Castor-oil plant, Cresses, Vanilla, Hazel, Celery, Tomato.

93. Describe the fruit of the Almond, Horse-chestnut, Walnut, Olive, Medlar, Hop, Mulberry, Juniper, Yew, Cypress.

94. Describe six different modes of dehiscence in anthers, and give an example of each.

95. Define stipules, and describe those of the Rhubarb, Ipecacuan, Cucumber, and *Ficus elastica* (India-rubber Fig).

96. Describe two forms of Uniparous Cyme.

97. Explain the formation of the Hip of the Rose, and contrast it with the fruit of the apple, showing the points of agreement and difference.

98. What is meant by Peduncle? Explain and give examples of a Phylloid Peduncle, a Succulent Peduncle, and a Hollow Peduncle.

99. What is meant by Æstivation? Describe valvate, imbricate, and induplicate Æstivation, and give drawings of each of them.

100. Describe the organs of Reproduction of Cycas and Encephalartos.

101. Describe the reproductive organs of Lycopods.

102. Contrast the Natural Orders, Labiatæ, and Boraganaceæ, pointing out the characters in which they agree and those in which they differ.

103. Refer the following plants to their Natural *Orders:—Hellebore,* Cheledonium, Samphire, Ragwort, Box, Digitalis, Pimpernel, Frogs-mouth, Poplar, Juniper.

104. Describe the inflorescence of the genus Carex and its floral organs, and refer the genus to its Natural Order.

105. Describe the structure of the leaves of the Sundew (*Drosera*) and the phenomena connected with their movements.

106. Describe the fruit of the Lemon, the Geranium, the Ipecacuan plant, the Mallow, and the Mignonette.

107. Gamopetalous dichogamous Dicotyledon, with pentamerous symmetry, superior ovary and free central placenta. Refer the plant to its Natural Sub-class and Order.

108. Describe the different kinds of fruit in Cruciferæ, and give an example of each.

109. Describe the different kinds of Vegetable Parasites, and give an example of each.

110. Indicate—(1) the essential characters; (2) the general properties; (3) the officinal and economic plants of the Orders Malvaceæ, Euphorbiaceæ, and Umbelliferæ.

111. Name the plants which furnish Kino, Chestnuts, Tamarinds, Quinine, Sago, and Squills, and the Natural Orders to which they belong.

112. Give the Botanical names, Natural Orders, and native countries of Maize, Tobacco, Tapioca, *Cayenne Pepper*, Date, and Parsley.

113. Describe Dichogamous and Dimorphic Plants, and give an example of each.

114. Describe the reproductive organs of Equisetum.

115. Describe a Spikelet of Barley.

116. Describe fully the phenomena connected with the movement of the leaf of Dionæa Muscipula (Fly-trap), and explain the apparent object of these movements.

117. Describe the characters of the vegetation of the western parts of Ireland included in Professor Forbes' Asturian Region. Mention some of the characteristic plants of the region.

118. Mention the sources whence plants derive their nitrogen in connection both with the air and the soil.

119. Explain the mode of Fertilisation of Œdogonium and Saprolegnieæ, and refer each of these plants to their Natural Order.

120. Describe the Natural Order Lauraceæ, and give examples. Mention their properties, and give examples of their products.

121. Describe the Morphological changes in the fruit of the Cocoa-nut Palm.

122. Explain the Morphology of the Arillus in plants; and give examples.

123. Describe the phenomena connected with the movement of Tendrils, and give examples.

124. Mention the points of difference between *Nymphæa, Nuphar,* and Nelumbium.

125. Point out the affinities between the orders Geraniaceæ, Linaceæ, Oxalidaceæ, and Balsaminaceæ.

126. Monochlamydeous Dicotyledon, with a five-parted perianth, five stamens, three styles, a trigonous achene, orthotropal albuminous seed, and embryo curved and lateral. Give Natural Order.

127. Give the characters by which the Natural Order Campanulaceæ is distinguished from the Natural Order Lobeliaceæ; the Natural Order Umbelliferæ from the Natural Order Araliaceæ; and the Natural Order Galiaceæ from the Natural Order Cinchonaceæ.

128. Refer to their Natural Orders—Gamboge, Jute, Catechu, Savin, Mulberry, and Chocolate.

129. Describe the reproductive process in the genus Œdogonium (one of the Algæ).

130. Describe the spores of Lycopodeaceæ, and mention the difference between the spores of Selaginella and those of Lycopodium.

131. Give the characters of the Orders Gnetaceæ, and mention a genus in the Order which has a marked character in its cotyledons.

132. Describe the Order Polygonaceæ, and give examples of Medicinal and Economic Plants in the Order.

133. Give the characters of the Andrœcium of Asclepeadaceæ.

134. Describe the genus Carex.

135. Give the characters of the stem, leaves, flower, and fruit of Pandanus.

136. Describe the morphology of the flower of an Orchis.

137. Describe some of the marked forms of Calyx and Corolla which occur in Ranunculaceæ, and trace their forms through various stages of abnormality as shown in different genera.

138. Divide the British genera of Ranunculaceæ into groups according to their Æstivation, Anthers, Carpels, and Seed.

139. Describe the Receptacle of Myosurus.

140. Give the distinguishing characters of Ranunculus repens, R. acris, and R. bulbosus.

141. Mention some species of British Ranunculaceæ with undivided leaves.

142. Mention some orders allied to Ranunculaceæ, and give their diagnosis.

143. Mention a peculiarity in the flower of Pæonia Moutan.

144. Mention a genus of Ranunculaceæ in which all the leaves are opposite.

145. Separate Hamadryas from Ranunculus.

146. What are the number of known species of Ranunculaceæ, in what climates are they found, and what are the properties of the Order?

147. Where do Ericaceæ attain their maximum, and what Order represents them in Australia?

148. Give the distribution of the species of *Erica and Calluna* in Britain.

149. Give a short account of the characteristic Floras of Great Britain as indicated by Watson and Forbes.

150. Mention the Regions of Vegetation on a lofty mountains in the tropics.

151. What plants characterise the shrubby region on the Swiss Alps, and what plants characterise the same region on the Andes?

152. Mention some palms of temperate regions.

153. Give a list of plants which may be said to characterise the highest Alpine ranges in Britain.

154. Mention some Scotch plants which are confined to very limited localities.

155. Give a sketch of Hooker's views as to insular Floras.

156. In speaking of Geographical Distribution, what is meant by Representative Plants? Give examples.

157. Give Watson's altitudinal zones of Vegetation in Britain, and mention some of the plants which characterise them.

158. Mention the Seaweeds which characterise the zones of Marine Vegetation in Britain.

159. Describe the effects produced on the Flora of St. Helena by the introduction of new plants from other countries.

MATERIA MEDICA AND PHARMACY.

1. You are required to give a sketch of the therapeutical effects and uses of Light and Heat, and of their negations, Darkness and Cold.

2. Classify mineral waters according to their compositions; and mention examples, the chemical characteristics, medicinal properties, and uses of each class.

3. Describe the mode of preparing *Sulphur præcipitatum*, and explain by symbols the theory of the process. Name the substance with which the commercial preparation is usually contaminated; and point out the way in which this impurity has been introduced, and the mode of detecting its presence.

4. Enumerate the constituents of urinary concretions; and give an account of the class of medicines to which the name of Lithontryptics has been applied.

5. Give a sketch of the medicinal properties, uses, and doses of the preparations of Manganese, and point out the chemical characters of these substances.

6. Name some officinal seeds whose albumen (*perisperm*) is endowed with poisonous properties.

7. *Give a sketch of* the chemical changes which

medicines and the organism mutually suffer by their reciprocal action.

8. In what do disinfectants and antiseptics differ from each other? Enumerate the chief agents used as disinfectants, and explain their *modus agendi.*

9. How is Cod-liver oil obtained? By what chemical character are liver-oils distinguished from the oils of other parts of the animal body?

10. Describe the method of making and of purifying Chloroform. Mention the specific gravity of this liquid; and state the tests by which its purity may be ascertained.

11. From what species of Cinchona is yellow bark obtained; and where does it chiefly grow? How is disulphate of quina manufactured, by what tests can the purity of this salt be determined, and what are the characters by which quina and cinchonia are distinguished from each other?

12. Describe the medicinal properties, uses, doses, and modes of administration of bichloride of mercury, arsenious acid, hydrocyanic acid, and iodide of iron.

13. Enumerate the chief medicinal agents which affect the movements of the iris; distinguishing those which cause dilatation from those which produce contraction of the pupil. And state what indications, for the use of these agents in cerebral diseases, have been drawn from their known effects *on the pupil.*

14. What vegetable articles of food are admissible and what are objectionable, in a case of diabetes?

15. Describe the botanical character and medicinal qualities of *Conium maculatum.*

16. Give a sketch of the pharmacological history of the compounds of lead; to embrace their general chemical characteristics, medicinal and poisonous effects, therapeutical uses, and antidotal treatment; and to include a notice of the preparation and special properties of those compounds which are in ordinary use as medicines.

17. Describe the botanical characters, chemical properties, and medicinal and poisonous effects of the seeds of *Strychnos Nux-vomica.* State how strychnia is obtained, and describe the chemical characteristics of this alkaloid, as well as of brucia. Lastly, mention the physical and chemical characters by which Cusparia bark is distinguished from the bark of the *Strychnos Nux-vomica.*

18. Describe the modes of preparing the compounds of ammonia contained in the British Pharmacopœia; and give the theories of the processes and the formulæ of the various compounds.

19. You are required to state by what characters you would detect—

The adulteration of scammony with chalk, starch, and guaiacum.

The substitution of carbonate of zinc for the *oxide of that metal.*

The presence of the leaves of *Cynanchum Argel* and of *Tephrosia apollinea* in Alexandrian senna.

The intermixture of the meal of white mustard seeds with that of black mustard seeds.

The presence of nitrate of potash in commercial nitrate of silver.

The contamination of chlorate of potash with chloride of potassium.

The adulteration of powdered rhubarb with turmeric.

The presence of sulphate of lime in *Hydrargyri Ammonio-chloridum B. P.*

20. Enumerate and classify alimentary principles; give their chemical formulæ; and state the uses which they respectively serve in the animal economy.

21. Enumerate the various urinary deposits, and state what remedies you would have recourse to with the view of obviating the tendency to their formation.

22. Give general hygienic directions (including diet) for the guidance of patients suffering from calculous disease in its several forms.

23. Mention four of the principal anthelmintics, and give their natural history in full.

24. Describe Potassa, Soda, Liquor Ammoniæ, Sulphuric Acid, and Alcohol; giving in each case—

A chemical history.

The mode of preparation.

The method of testing purity.

The pharmaceutical use in full.

25. What inconvenience (irrespective of all thera- utical considerations) might you expect to result om dispensing the following mixture and lotion ?—

℞ Magnesiæ
Aquæ Destillatæ
Misce.

℞ Iodinii
Liquoris Ammoniæ
Misce.

26. Describe the varieties of Chalybeate water—the action of heat and chemical reagents upon them. State the results of their decomposition.

27. Give a history of *Nux Vomica*, including its source, physical characters, chemical composition; the preparations employed in Medicine, with their doses; its physiological action and therapeutical uses.

28. Distinguish between the fruit of *Conium maculatum* and the fruits of other *Umbelliferæ.*

29. Describe the mode of preparing *Bismuthi subnitras B. P.* With what substances is it usually adulterated, and how can these be detected?

30. Give the composition and doses of the following Galenical preparations:—

Pulvis Kino compositus.
Pilula Saponis composita.
Pilula Colocynthidis composita.
Unguentum Gallæ compositum.
Spiritus Ammoniæ aromaticus.
Pilula Galbani composita.

31. From what plants are the different sorts

Catechu obtained? Describe the mode of extracting and preparing them.

32. What drugs do we obtain from Roots, and what from underground stems? Describe the mode of preparing each for medicinal use.

33. Enumerate the medicinal Euphorbiaceæ, and give a general description of the plants, and of the drugs obtained from them.

34. Enumerate the preparations of Potash, Ammonia, Lime, and Magnesia employed both as direct and remote antacids; and describe in full the medicinal action of each.

35. Enumerate the preparations of Mercury contained in the British Pharmacopœia; describe the processes we are recommended to adopt in order to obtain them, and the decompositions which take place during their formation.

36. What pharmaceutical preparations are more especially liable to become changed by exposure to light and to air? State the nature of the changes so effected.

37. Enumerate the genera contained in the Natural Orders Leguminosæ and Terebinthaceæ which yield medicinal plants.

38. Make a list which shall contain the names of all the white powders mentioned in the British Pharmacopœia, and state how you would test them chemically in order to determine their nature.

39. Give the botanical, physical, and chemical *history of the* following drugs; describe their therapeutical peculiarities and physiological action according as they may be administered in medicinal dose or in excessive quantity:—

1. Cinchona.
2. Gentian.
3. Nux Vomica.
4. Camphor.

40. Mention the principal Pharmacopœial purgative agents, and give the composition and doses of each.

41. State the Preparations of Arsenic and Antimony contained in the British Pharmacopœia, with their doses. Write a prescription in full for a case of bronchitis, a case of diarrhœa, and a case of vomiting.

42. (1.) *Gallic Acid.* Its characters, namely—1. Its form. 2. Taste. 3. Solubility. 4. Test for it in solution. 5. Elementary composition. 6. Action. 7. Diseases for which it is used. 8. Doses, and frequency. 9. Forms for administration.

43. (2.) *Hydrochlorate of Morphia.* Characters—1. Form. 2. Taste. 3. Solubility. 4. Crystalline form. 5. Elementary composition. 6. Distinction from narcotine by heat; 7, or by potash solution; 8, or by perchloride of iron or its solution. 9. Details of its physiological action in medicinal doses on the stomach; 10, the bowels; 11, the mucous membranes; 12, the skin; 13, the secretion and excretion of urine; 14, the bile; 15, the

functions of the brain. 16. Its occasional inconvenient effects upon the nervous system; 17, the stomach; 18, the skin. 19. Prevention and removal of these. 20. Modes of administration in acute dysentery, with the best forms and doses; 21, also in acute bronchitis; 22, also in obstruction of the bowels. 23. Its chief pharmaceutic forms, and their average doses.

44. (3.) *Gentianaceæ.* 1. Their leading physiological action. 2. Any exceptions? 3. Any poisons? 4. Their leading therapeutic actions and uses. 5. Principal medicinal plants, and the parts of each that are used. 6. By what sensible character may a gentianaceous drug be generally known?

45. (4.) *Carbonate of Ammonia.* 1. Its sensible properties. 2. Action on it of water; 3, of rectified spirit; 4, of exposure to the air; 5, of metallic solutions. 6. Action on the body, is it poisonous? 7. Medicinal actions. 8. Uses in diseases. 9. Doses.

46. (5.) *Alcohol.* 1. Sensible properties of Absolute Alcohol. 2. Distinctions of Absolute Alcohol, Rectified Spirit, and Proof Spirit. 3. Effects produced on Rectified Spirit by water; 4, by exposure to the air; 5, by heat; 6, by sulphuric acid; 7, by nitric acid. 8. The elementary changes in the last case. 9. Effect of Chloride of Lime, Water, and Heat together. 10. Its general action on neutral inorganic salts; 11, on vegetable active substances.

47. (6.) *Diet.* 1. State the general dietary and special articles of food to be given in Scorbutus, arising from a too Saccharo-farinaceous dietary; 2, in Diabetes mellitus; 3, in uric acid gravel in the case of a vigorous man; 4, and the mode of action of the prescribed dietary in the second and third of these cases.

48. Enumerate any ten of the aperient drugs used in medicine; and state to what points you would direct your attention, and what tests you would apply, in order to detect either adulteration or substitution.

49. What preparations of Iron are mentioned in the British Pharmacopœia? State the dose of each, and the decompositions which occur during their formation.

50. Arrange, under separate headings, the Vegetable Tonics, distinguishing those which contain tannic and gallic acids from those which do not. Give the botanical class and order of the plants in each case, and state to what natural family they belong.

51. Give the natural history of Honey, Wax, Musk, and Castor, and a complete chemical description of the first two substances.

52. What are the *physical* properties of Alcohol, Ether, Chloroform, and Oil of Turpentine? Describe especially the effects of heat and cold on those fluids.

53. Enumerate the preparations of Copper used medicinally, and give a full chemical description of each.

54. Define Spiritus Rectificatus and Spiritus Tenuior (B.P.). Give the reasons for the choice of the one or the other menstruum in the preparation of the Tinctures.

55. Give a full description of Camphor, including its botanical history, its physical and chemical characters.

56. Enumerate the principal disinfectants, and describe their mode of action.

57. State the composition and doses of the following Galenical preparations:—

Tinctura Assafœtidæ.
Tinctura Camphoræ Composita.
Tinctura Opii.
Vinum Antimonii Potassio-tartratis.
Liquor Potassæ.
Liquor Potassæ Arsenitis.
Pilula Hydrargyri Chloridi Composita.
Pulvis Ipecacuanhæ Compositus.

58. Enumerate the preparations of Antimony contained in the British Pharmacopœia; describe the processes recommended to obtain them, and the decompositions which take place during their formation.

59. Separate the Alkaloids in the following groups, by their physical and chemical characters:—

Quina, Cinchonia, Quinidina.

Morphia and Codeia.
Strychnia and Brucia.

Give a process for the preparation of Hydrochlorate of Morphia.

60. Enumerate the principal Emetics. Describe the peculiarities in the action of each, and the indications for their selection.

61. Describe Iodine and Iodide of Potassium. How is the latter salt prepared? What are its occasional impurities and the mode of detecting them? What are its pharmaceutic and therapeutic uses?

62. Describe the following roots:—Aconiti Radiæ, Podophyllum, Pareira, Calumba, Arnica, Gentiana, Rheum. What are the properties of the first two? Give the mode of preparing Aconitia and Podophylli Resina, and state for what purposes, and how, they are employed.

63. Classify the pharmacopœial Purgative Agents, mentioning the difference in their action; and give the source, composition, and dose of each.

64. Describe the preparation and physical properties of Sulphuric Acid. Give the strength of the pharmacopœial compounds, and state their physiological effects and medicinal uses. What impurities does sulphuric acid sometimes contain? Give the means by which they may be recognised.

65. Give the preparation and composition of Opium. Describe the general characters of its proximate *principles*, and the effects produced by their

internal administration as far as they are known. Enumerate the pharmacopœial preparations containing opium or morphia, and state the quantity in each.

66. Describe the preparations, composition, properties, physiological effects, and uses of Chloroform.

67. Describe the pharmacopœial Cinchona Barks and their constituents, giving their physiological effects and uses.

68. Describe the Acids obtained or prepared from Galls. Give their composition, properties, physiological effects, and uses.

69. Which officinal articles contain metallic Iron; which a protosalt, and which a persalt, of Iron?

70. How are the liquid extracts of Bael, Pareira, and Ergot prepared? What quantity of the crude substance is represented by one pint of each liquid extract? What is the use of Ether in the latter preparation?

71. Give the preparation and a description of Precipitated Sulphur. How does commercial Milk of Sulphur usually differ from it?

72. Describe the physical characters, chemical constitution, and more especial therapeutical action of the following drugs:—Calumba, Gentian, the Cinchonas, Sulphate of Iron, Sulphate of Zinc.

73. Describe the methods of testing for the presence of Morphia and of Meconic Acid. State the *sources of fallacy* connected with the determination

of the latter substance, and the means of establishing its presence.

74. What distinction do you draw between a Narcotic and a Sedative, and between a Tonic and a Stimulant? Give types of each of these classes of remedy.

75. Describe the physical and chemical characters of Chloroform, and the mode of preparing it recommended by the British Pharmacopœia.

76. On what occasions and with what view does the British Pharmacopœia direct Protochloride of Tin, and Metallic Gold, to be used in testing pharmaceutical preparations?

77. What chemical and physical changes occur in Rye during the formation of the Ergot?

78. Give the chemical history of Salicina, stating the changes effected in it by its passage through the system, and by re-agents out of the body. Mention the various sources from which it may be obtained.

79. How would you detect Narcotina in Morphia, and Cinchonia and Quinidina in Quina?

80. What are the chemical changes which Citrate of Potash, Tannic Acid, Salicina, and Ammonia respectively suffer in their passage through the system?

81. Give a botanical description of *Atropa Belladonna*, and describe its medicinal effects and uses. *Give a sketch* of the properties and uses of *Atropa and its sulphate.*

82. Describe the process for making the *Ferri Ammonio-Citras*, British Pharmacopœia; and explain the successive steps of the operation. State the percentage quantity of sesqui-oxide of iron which this salt yields when decomposed by potash.

83. Briefly state the Effects, Uses, and Doses of the following preparations of the British Pharmacopœia:—

Liquor Arsenici Hydrochloricus.
Syrupus Ferri Iodidi.
Tinctura Lobeliæ Ætherea.
Tinctura Quinæ Composita.
Tinctura Conii.

84. You are requested to describe the cerebro-spinal class of medicines commonly called Narcotics. The description is to include the enumeration and physiological classification of these agents, their effects, modus operandi, and medicinal uses.

85. Give the pharmacological history of Mercury and its compounds, to embrace the medicinal and poisonous effects of those agents, their therapeutical uses, and antidotal treatment; and the preparation, composition, chemical characteristics and special medicinal properties of those mercurial compounds which are contained in the British Pharmacopœia.

86. Describe the therapeutical action of the following Salts, and give their chemical constitution in symbols:—

a. Antimonii potassio-tartras.

β. Potassæ tartras.
γ. Plumbi acetas.
δ. Potassii iodidum.
ε. Cupri sulphas.

87. State the chemical characters, pharmaceutical and botanical origin, of the Turpentines prescribed medicinally, and give the chemical history of the compounds obtained by distilling turpentine.

88. How would you distinguish the true from the false Angustura Bark? State the botanical origin and the chemical characters of each.

89. Describe in full, and explain by diagram, the changes which occur on adding a solution of Ammonia to a solution of Corrosive Sublimate.

90. Detail the examinations to which you would subject the Water and the Air of a locality in order to satisfy yourself that they possessed every hygienic quality, and were free from every noxious ingredient.

91. Describe the change which occurs when Amygdalin is decomposed by Emulsin, giving the atomic constitution of these two bodies, and also that of *the products* obtained. Enumerate the pharmaceutical preparations which might be procured *from these products* by chemical treatment.

92. Give instances occurring in the Botanical History of Materia Medica, in which we observe deviations from general laws regulating vegetable *organisms.*

93. Describe the decompositions which occur in obtaining Commercial Carbonate of Soda from Cloride of Sodium, by the processes now adopted.

94. State shortly the chemical qualities of the undermentioned preparations, giving the specific gravity of each, and the pharmaceutical uses of Nos. 1, 2, 3, and 5. Describe the decomposition which takes place in the formation of No. 6:—

1. Ammoniæ liquor.
2. Spiritus rectificatus.
3. Acidum Aceticum.
4. Liquor Ammoniæ acetatis.
5. Æther
6. Spiritus Ætheris Nitrici.

95. You are required to describe the mode of preparing Tartaric Acid, to explain the successive steps of the process; to state the decomposition, saturating power, and chemical characteristics of this acid; and to point out the method of detecting the adulteration of powdered tartaric acid with cream of tartar, and powdered citric acid with tartaric acid.

96. Enumerate the officinal gum-resins obtained from the natural order *Umbelliferæ;* describe the methods of obtaining them, their chemical composition and characters, and their medicinal properties, uses and doses.

97. With what indigenous plants is Hemlock liable to be confounded, and how would you distinguish it?

98. What are the ingredients of which the following preparations are composed:—Extractum Colocynthidis compositum, Decoctum Aloës compositum, and Pilulæ Rhei compositæ?

99. Describe the most appropriate method of combating poisoning by Oil of Vitriol, White Arsenic, Oxalic Acid, and Opium.

100. Briefly state the effects, uses, and doses of the following substances:—Elaterium, Strychnia, Savine, and Bichloride of Mercury.

101. Enumerate the preparations in the British Pharmacopœia containing opium, and state the proportion of the drug contained in each.

102. Describe the chemical changes which take place during the formation of Nitre.

103. Give the chemical history of Cod Liver Oil, and describe the varieties known in commerce.

104. State the adulterations occasionally practised in the cases of the following drugs, and describe the means of detecting them:—Calumba, Castor Oil, Uva Ursi, Honey, Scammony, Opium, Senna, Musk.

105. *Assafœtida.* 1. Among what substances is it classed? 2. Whence obtained? 3. From what species and natural family? 4. How known by sensible properties? 5. Proximate chemical composition? 6. In active part, and how separated? 7. Actions on the body. 8. Principal uses in diseases. 9. How given by the mouth and anus?

106. Chalybeate Mineral Waters. (1) The two forms of iron in them. (2) Examples of each in Britain, or on the Continent. (3) How to distinguish each kind. (4) When not simple, what other active matters usually concur, constituting four varieties? (5) Actions of a simple chalybeate spring. (6) Diseases principally treated by them. (7) Any precautions necessary. (8) Influence of concurring active substances on the actions of iron.

107. *Charcoal.* (1) Define it. (2) Two kinds used in medicine. (3) Their composition respectively. (4) How distinguished from each other? (5) How purified? (6) Uses in Pharmacy. (7) Uses as disinfectants. (8) Chemical action as such. (9) Which preferable?

108. *Cantharides.* (1) Ordinary actions internally in medicinal doses on the urine; (2) on the mucous membranes. (3) In large doses on the alimentary canal; (4) on the kidneys; (5) on the genital organs. (6) Usual form for internal use. (7) Dose and frequency of this preparation. (8) Action of Cantharides externally. (9) The several local changes caused according to the length of its application; (10) in certain constitutional states, such as typhus. (11) Occasional inconveniences through absorption by the skin. (12) Treatment of these.

109. *Nitrate of Silver.* (1) Composition Characters, viz., form, weight, colour, fracture, taste, solubility, effect of exposure, test for it in solution. (2) Action in large doses internally. (3) Any remote

action then caused. (4) Antidote. (5) Action in medicinal doses. (6) Special uses. (7) Form and dose. (8) Inconvenient effect sometimes arising. (9) In what circumstances. (10) Precautions against it. (11) Action externally when concentrated. (12) Applications in acute disease. (13) In chronic disease. (14) Action in diluted solution. (15) Examples of this.

110. How may Arsenious Acid be known by heat simply?

111. How may Solution of Chlorated Lime be known by sulphuric acid?

112. How may Citrate of Iron and Alkali be known by ferrocyanide of potassium and hydrochloric acid?

113. How may Acetic Acid of D. 1.065 be most easily known to be a diluted acid?

114. State how, by external characters, to distinguish, in fragments, Egyptian Opium substituted for ordinary Smyrna Opium.

115. Why has bruised bitter Almond no odour till it is moistened?

116. How, by external characters, may the substitution of Dulcamara leaves for Belladonna leaves be discovered?

117. If Opium and Morphia disagree, state three substitutes which may be used to obtain sleep, and their relative probability of action.

118. Mention a remedy for destruction of vermin *on the skin, and* the form for use.

119. The pill of Lead and Opium having been given for chronic dysentery, what symptoms show that it has been continued too long?

120. State the several mechanical means for distinguishing the early stage of Opium-poisoning from Apoplexy.

121. Scurvy having arisen under an amylaceous, leguminous, and saccharine dietary, with thin broth, what proximate principles should be supplied, and in what form?

122. How may the Citrate of Iron and Ammonia, Tartarate of Iron and Potash, and other double salts of the like kind, be distinguished in solution from simple iron salts?

123. What Dietetic system is generally advisable in Uric Acid Gravel, and what in Phosphatic Gravel.

124. What substances appear to lessen the waste of the textures in the exercise of their functions, and how is this action proved?

125. How may Tincture of Guaiac be distinguished from all other tinctures by a single chemical test?

126. State the precautions for preventing Tincture of Aconite from acting too powerfully, and the treatment when its action is too great.

127. State the effects of full dose of Opium severally on the sweat, urine, bile, and mucous *secretions.*

128. Give the dose of Sulphate of Quinine as a remedy for intermittent, as a prophylactic against it, as a tonic in dyspepsia, and a convenient formula for the last case.

129. What are the four leading Alkaloids in the Cinchona Barks, and their relative energies?

130. Mention the characters for distinguishing powder of Ergot from all other powders.

131. What is the usual dose of Croton Oil? what is an unsafe dose? and what are the effects of each, and how may those of an unsafe dose be counteracted?

SURGERY.

DISEASES AND INJURIES OF THE BONES.

1. Give the different varieties of both simple and compound fractures of the Patella; describe the surgical anatomy of the parts connected with such injuries; and then give the mode of treatment, both locally and generally, of the various fractures of the Patella; pointing out such compound fractures of this bone; and such injuries of the Knee-joint, connected with them, as may require either the immediate or the more remote amputation of the limb.

2. What are the different causes of an Inflammation of the Tibia, which may end in abscess, caries, or necrosis of this bone? Trace the symptoms, treatment and effects of each of these varieties of Tibial disease through their several stages, from their commencement in inflammation up to favourable or unfavourable issue of the abscess, caries, or necrosis, as the case may be.

3. Describe the symptoms and appearances of fractures of the Os Innominatum; when the injury is confined to the Crista; when the fracture passes across the bone, behind the Acetabulum; when it extends through some part of that cavity, or through

some portion of the Pubis or Ischium in front of it, whether on one or both sides of the Pelvis. Mention the treatment, both locally and generally, required for these several varieties of fracture, and the probable termination of the cases.

4. Give the local and general treatment of a compound fracture of the Thigh-bone, about its middle third, whether arising from falls, blows, or gun-shot; and when it is decided to amputate the Limb, either immediately after the receipt of the fracture, or at any subsequent period, you will give your reasons for such decision.

5. Describe the diagnosis and the treatment of Fracture of the Acromion and of the Scapula.

6. Mention the different fractures which occur at the Elbow, and at the superior radio-ulnar joints; state the diagnostic symptoms, and the best treatment of each injury.

7. Mention the most frequent accidental cause, the local symptoms, and the proper treatment of a simple fracture through the *carpal* end of the Radius.

8. Mention the various fractures of the Patella, and the mode in which they are produced. Mention and explain the symptoms which follow this accident; describe the surgical treatment, and the method by which each variety of this injury is repaired.

9. Describe the symptoms (local and general) of

Acute Periostitis of the Tibia, resulting in Necrosis. Explain the cause of the death of the bone, and the method of reparation adopted by Nature in such a case.

10. Describe the various Tumours affecting Bone, their structural characters, and right modes of dealing with them.

11. Give a description of the symptoms and effects of Fracture of the Ribs, according as one or more bones are broken, as the fracture is simple or compound, and as it does or does not implicate the pleura lining them, or the serous covering or substance of the lungs; and mention the local and general treatment required, according to the varieties in the symptoms and nature of the several cases; and where the injury is fatal, either directly or remotely, describe the appearances you would expect to find on an examination of the chest.

12. Describe the symptoms of fracture of the Neck of the Thigh-bone, both within and without the Capsule, the treatment and the usual result.

13. Describe the local symptoms of Acute Periostitis (say of the Tibia); state the possible results, and mention the treatment.

14. Describe all the symptoms which indicate a Fracture of the Clavicle in the middle of the bone. State the position of the broken ends of the bone, and the cause of the deformity produced. Describe *the treatment.*

15. When the Femur is broken a little below the lesser trochanter, what is the position of the upper and of the lower fragment? To the action of what muscles is the distortion of each of them owing?

16. Describe the symptoms of Osteo-myelitis. State what are the principal causes of this disease, the consequences that may result from it, and the treatment that has been adopted with the view of averting them.

17. Describe Tumours of Bone, their pathological characters and diagnostic marks, and the treatment required for their removal.

INJURIES TO THE HEAD.

1. Describe the local and general treatment of a Lacerated Wound of the Scalp; give the distinguishing marks of common and erysipelatous inflammation attending such an injury; and when the external wound is succeeded by inflammation of the brain and its membranes, you will detail the symptoms and the treatment of its varieties, through their several stages, up to a favourable or fatal issue, giving such appearances as you will expect to find within the head after death, according to the symptoms which you have had to combat in the progress of the case.

2. What are the natural processes by which

Incised, Lacerated and severely Contused wounds of the Scalp are repaired? State the Surgical treatment of each kind of wound.

3. What are the symptoms and appearances attending a Fracture of the Skull which require the operation of the Trephine, either immediately after the receipt of the injury, or at any subsequent period? Give the method of performing the operation, with the local and general treatment of the patient up to a favourable or fatal issue.

4. When a person is rendered insensible, immediately after the receipt of a blow on the head, unattended with a tumour or laceration of the scalp, what are the symptoms which would induce you to consider it a case of Concussion of the Brain, without any of the bones of the skull being fractured? Give the treatment to be pursued in such concussion, under mild, or the most dangerous symptoms, through the various stages up to a favourable or fatal issue; and when the case terminates in death, you will note down the appearances, such as you expect to find, within the head, according to the symptoms which you have been treating. You may add the history of any cases of Concussion of the Brain, which you may have seen worthy of observation.

5. Mention the kind of accident which might produce Fracture of the Base of the Skull; and describe the symptoms which indicate such an

injury. State the treatment to be adopted, and the probable or possible result.

6. Describe the symptoms indicative of Inflammation of the Membranes or of the substance of the Brain, which may follow fracture of the skull, or other injuries to the head. Mention the probable result of such inflammation.

7. Under what circumstances of Injury of the Head is Suppuration within the Skull likely to take place? State where such deposits of Pus may occur, what symptoms indicate its formation and presence, and what treatment you would adopt to afford relief.

8. What are the history and symptoms of Intracranial Hæmorrhage following concussion?

a. Active intra-cranial hæmorrhage.

b. Passive intra-cranial hæmorrhage.

What is the practice to be adopted in these cases?

DISEASES AND INJURIES TO THE SPINE.

1. State the symptoms which are produced by fractures of the Vertebræ, affecting the Cord, in different regions of the Spine. What is the probable duration of life after such injuries, according to the situation of the injury?

2. What would be the probable symptoms resulting from Fracture of the Sixth Cervical Verte-

bra, accompanied by lesion of the corresponding portion of the Spinal Cord? What would be the proper treatment in such a case?

3. State the symptoms and diagnostic signs of 'Psoas Abscess;' describe the pathological conditions associated with it, and what you consider to be the best treatment of such a case.

4. What is Spina Bifida? What are the effects usually produced by it? Give the treatment.

5. Describe the causes, symptoms, consequences, and treatment of Acute Caries of the Lower Dorsal Region of the Spine.

DISEASES OF THE BREAST.

1. Describe the pathological characters of Adenocele, its symptoms, diagnosis from other diseases of the breast, and the appropriate treatment.

2. Enumerate the various diseases of the Female Breast. Give, first, the symptoms, appearances, and treatment of such as yield to local and constitutional remedies, stating those remedies; secondly, such as are considered to be malignant. Describe the method of performing the operation of removing a diseased breast, with the subsequent management of the patient under favourable or adverse circumstances; and, lastly, you will state such local and

constitutional appearances as in your opinion forbid the use of the knife.

3. Abscesses in the Female Breast:—Describe their causes, situation, progress, and treatment.

4. What are the distinctive characteristics, in symptoms and progress, of Cancer of the Breast, and of Chronic Glandular Mammary Tumour (Adenocele)? Describe the appearances of each on section, and under the microscope.

INJURIES AND DISEASES OF THE JOINTS.

1. What are the diagnostic signs of chronic rheumatic arthritis of the Hip-joint? Describe the pathological changes observed in such cases after death.

2. Give the various dislocations of the Shoulder Joint, with the method of reducing each variety; and in case of being unsuccessful in your first attempt, state the means to be pursued to secure a more fortunate result of other trials.

3. Mention the different simple dislocations which occur at the Elbow, and at the superior radio-ulnar joints; state the diagnostic symptoms, and the best treatment of each injury.

4. What are the consequences of a wound *into* a healthy Knee-joint? and what morbid changes may *occur within* the joint from the injury? State

your opinion whether suppuration in the joint is necessarily fatal to its recovery.

5. Under what circumstances would you excise the Knee-joint? Describe, step by step, the manner in which you would perform the operation.

6. With what form of Fracture is Dislocation of both the bones of the Forearm backwards at the elbow liable to be confounded? How are these injuries to be distinguished, and how is each to be treated?

7. Describe the early and acute stages of Inflammation of the Hip-joint in a child, and mention the constitutional and local treatment you would adopt.

8. Name and describe the different diseases of the Knee-joint, and give as comprehensive a view of such cases as the time for this examination will permit.

9. Describe the various dislocations of the Femur at the Hip-joint, and the signs of the injury, according to the several positions of the displaced bone; distinguishing between each form of dislocation, and other accidents for which it may be mistaken; give the method of reduction in each case respectively, mentioning the general, as well as the local measures necessary.

10. Under what circumstances of disease or injury is excision of the Head of the Humerus preferable to amputation at the shoulder-joint?

11. *How* would you discriminate between a frac-

ture of the neck of the Femur, a dislocation of the Hip-joint, or a considerable contusion and swelling of the soft parts in the neighbourhood of the Acetabulum? What is the age, constitution, and sex of the person in whom a fracture of the neck of the Femur most commonly occurs? Give the treatment which you would pursue in such a case through its various stages, with the amount of success which you would expect; state also the condition in which you are likely to find the parts on a *post-mortem* examination at a remote period after the accident.

12. Mention the different kinds of dislocations of the Ankle-joint; give the method of reducing each kind of dislocation of this joint, and the subsequent management of such cases; you will describe the treatment to be pursued, both locally and constitutionally, of a compound dislocation inwards of the ankle-joint, in which the lower head of the tibia protrudes, attended with much laceration of, and bloody oozing from, the surrounding soft parts; finally, you will state the special circumstances which would induce you in such cases to recommend the amputation of the limb.

13. How is acute synovitis of the Knee-joint usually produced? Mention the signs and symptoms by which it is characterised; and state how you would treat it.

14. Describe the nature of the injury which the *parts sustain in a* Compound Dislocation of the Foot

outwards. State the occasional obstacles to the reduction, how they are to be overcome, and how the foot should be kept in position.

15. In which directions may the Astragalus be dislocated? and how does this accident usually occur? Describe the attendant signs, possible complications, and consequences of this injury; and state how you would deal with it according to circumstances.

16. What are the diagnostic symptoms of a loose cartilage in the Knee-joint? What other diseased condition of that joint presents similar symptoms; and what is the treatment to be adopted in each of these diseases?

VENEREAL DISEASES.

1. At what time after infection does Gonorrhœa generally commence? What is the seat and nature of that disease? What are its effects in mild and in severe cases, and what is the appropriate treatment in *different cases?*

2. What are the symptoms and what is the treatment of Congenital Syphilis?

3. State the various symptoms and stages of a mild and virulent Gonorrhœa in both sexes; describe the condition of the different parts of the Urethra in the various stages of this disease, and note the discharges for which Gonorrhœa is occasionally mis-

taken, both in the male and female, and how such mistakes are to be avoided; give the treatment to be pursued in the mildest, as well as the most aggravated forms of this disease in both sexes.

4. State in what forms of primary or of constitutional Syphilis you would give Mercury, and under what constitutional conditions you would withhold it. State also in what class of cases Iodide of Potassium should be preferred.

5. Describe the appearances of an ordinary Syphilitic Sore, and mention the different forms of Secondary Syphilitic Eruption.

DISEASES AND INJURIES OF MUSCLES, TENDONS, AND BURSÆ.

1. Describe the signs and give the treatment of Acute and of Chronic Inflammation of the Superficial Bursæ of the Olecranon, and of the Patella. Describe also the symptoms and treatment of enlargement of the deep palmar Bursæ.

2. To what morbid changes are Bursæ liable? Give examples; and mention such modes of treatment as you think most eligible.

SURGICAL DISEASES AND INJURIES OF THE RECTUM AND ANUS.

1. What are the causes producing abscess of the lower part of the Rectum; what are its consequences; and what treatment is to be adopted?

2. Mention the symptoms, and describe the treatment of Fissure of the Anus.

3. Give the pathological causes of Hæmorrhoids, and mention the treatment, palliative and radical, which you would adopt.

4. Describe the symptoms of Fistula in Ano; give the pathology of this disease, and explain the mode of operating now usually adopted.

5. How would yeu treat Prolapsus Ani in a child four years old, and also in the adult?

6. Mention the various forms of stricture to which the Rectum is liable, and the diagnosis between simple stricture and the narrowing of the canal due to organic disease.

INJURIES AND DISEASES OF THE VEINS.

1. Describe the appearance and pathological condition of a 'Varicose Leg;' the causes which may have produced it; the consequences to which it may lead; the treatment for its relief or cure.

2. Mention the symptoms of Inflammation occurring in veins, and how would you treat them?

3. Distinguish between Idiopathic and Traumatic Phlebitis.

4. *Give the* pathology of Embolism.

DISEASES OF THE SKIN.

1. State the difference between a Carbı
Boil, and any other phlegmonous swelling ; g
symptoms and appearance by which you can d
their nature and classification. State the ag
stitution, mode of life, atmospheric influence,
other causes which are favourable to their]
tion. Describe the treatment, both locally aı
stitutionally, of each variety, whether they c
in a mild or threatening form.

2. Give an account of the several affec
the skin due to syphilis, and the treatment
for the cure of each.

DISEASES AND INJURIES OF THE NE

1. What are the local signs, and most p
cause and treatment, of Post-Pharyngeal Abs
2. Describe the different kinds of wound
are most commonly met with from attempts
been made by persons intending to destroy
selves on any of the parts situated between tl
Jaw and the Sternum. Give the treatme
locally and generally, to be adopted, either
diately on the injury being inflicted, or subse
through the different stages.
3. *Mention the* causes of stricture or obs

of the Œsophagus; state explicitly the diagnostic signs of the various forms, and also their proper treatment.

4. Describe the diseases of the Tonsils in children, the causes of the frequency, the effects, immediate and remote, of their enlargement; and point out the best local and constitutional treatment of diseased tonsils.

5. Describe the diseases of the Thyroid Gland, and give the appropriate treatment for each case.

6. What are the different pathological changes which may give rise to Wry-neck? What cases are suitable for operation? Describe the operation and after treatment.

7. Describe the symptoms, pathology, and treatment of Lateral and Retro-pharyngeal Abscess respectively; also the differential diagnosis between such abscesses and the diseases which simulate them.

MORBID GROWTHS AND TUMOURS.

1. State the method of diagnosis between a Cancerous and a Recurring Fibroid Tumour, before and after removal by an operation; and the results to the patient (local and general) to be looked for after the removal of those growths respectively.

2. Describe Epithelial Cancer, and mention the *external parts liable* to be attacked with it, and the

surgical treatment proper for its removal from those parts.

3. In what situations are Fatty Tumours found? Give their diagnostic signs and treatment.

4. Give the pathology of Melanosis.

5. How would you treat an Osseous Tumour of a long bone (say the Femur) in a young subject?

6. At what period of life are Cartilaginous Tumours most frequent? Describe their internal structure.

7. Describe the pathology and structure of the different forms of Erectile Vascular Tumours and Nævi. Mention the usual sites of such growths, the principal methods of treatment, and the general principles on which these methods are founded. Indicate the conditions which would influence your choice of method of treatment.

INJURIES AND DISEASES OF ARTERIES.

1. What are the symptoms indicating a laceration of the posterior Tibial Artery, without external wound, in the upper third of the leg? Describe in detail what would be the proper treatment of such a case.

2. What is Inguinal Aneurism, and its probable causes? Give the diseases with which it may be confounded, and the mode of detection; describe the

operation of tying the lower or upper part of the external Iliac, or the common Iliac Artery, mentioning the circumstances which make it necessary to secure the latter vessel, and the subsequent treatment of the patient.

3. Describe the history, symptoms, and signs of a Popliteal Aneurism, from its first appearance to a very advanced stage of the disease; mention the diseases for which Popliteal Aneurism has been mistaken, and how such mistakes are to be avoided; trace the relative anatomy of the Femoral Artery and contiguous parts from the origin of the Profunda to the arrival of the artery in the Ham; describe the operation of tying the Femoral Artery in the upper third of the thigh for the cure of Popliteal Aneurism; state the processes which subsequently take place in the Aneurism by which its cure is ultimately accomplished; name the principal channels through which the circulation of the limb is carried on after the cure of a Popliteal Aneurism by the ligature of the Femoral Artery in the upper third of the thigh; briefly mention the conditions which after this operation sometimes prevent the cure of the disease, and those which endanger the limb or threaten life, and the proceedings that you would adopt under such circumstances.

4. Describe the symptoms *immediate* and *subsequent*, which are likely to follow a wound (say with *a penknife*) of the Femoral Artery in the middle of

the thigh. Mention the treatment which may possibly be required after such an injury.

5. Describe the symptoms, diagnosis, and treatment of complete subcutaneous rupture of the Popliteal Artery.

DISEASES OF THE MALE GENITALS.

1. State the various injuries, diseases, and conditions of the Testicle and Spermatic Chord, which may arise from natural, accidental, or congenital causes; describe such symptoms and appearances of the testicle or chord which may enable you to distinguish one disease from another, with the treatment to be followed in each variety, according to the symptoms you have sketched out.

2. Give the diagnosis and the treatment of each of the following forms of Hydrocele in very early life:—The common form, the congenital, and the encysted. Refer to any case or cases that have been under your observation.

3. How would you distinguish the nature of a Scrotal Swelling produced by the following different causes, viz.: 1, Hydrocele of the tunica vaginalis; 2, Hæmatocele; 3. Hernia; 4, Varicocele; 5, Diseases of the testicle?

4. Describe Phymosis and Paraphymosis; mention their causes, the various local pathological con-

ditions which they produce, and their appropriate treatment.

5. Give a description of Varicocele of the Spermatic Chord, its causes, symptoms, and treatment.

6. Describe the various diseases of the Testicle and Spermatic Chord, which are likely to yield to general and local treatment; you will further describe the appearances, symptoms, and diseases of this gland which require removal by the operation of Castration; the method of performing which you will detail, with the untoward circumstances which sometimes arise, either at the time or subsequently; finally, you will mention such diseases of the Testicle, Scrotum, or neighbouring parts, as would either make you doubtful of the success of Castration, or induce you to abandon it altogether, stating the reasons upon which you form these opinions.

7. What is a Hydrocele, and what are its causes, constitutional or local? Describe the general condition of the Sac in which the fluid is contained, as well as of the contiguous structures, and the properties of the fluid itself. Enumerate the diseases of the Testicle for which Hydrocele is liable to be mistaken; state the signs and means by which you would discriminate it from them, as well as from Hydrocele of the Chord, Hæmatocele, or Hernia. Describe the circumstances which would induce you to select the palliative or the radical mode of treatment; *and if* the latter, state which of the various

modes of effecting that object you would prefer, and briefly describe the manner in which you would execute it.

DISEASES OF THE EYE.

1. What is a Cataract? Describe the probable causes, and the periods of life at which it most commonly appears. Give the symptoms of a Cataract, from its earliest threatenings to its final formation, as also the diseases with which in its fresh stages it may be confounded. Numerate the varieties of Cataract, with the favourable and unfavourable circumstances for an operation; and describe the condition of the Eye, and general health, which forbid one.

2. Give an account of the appearance of the Fundus of the healthy Eye, as observed with an Ophthalmoscope; and of any morbid conditions occasioning blindness which you have seen by aid of the same instrument, with their treatment.

3. Describe Iritis; the causes, appearances, symptoms, varieties, morbid conditions, and the treatment in different circumstances.

4. Describe the Ophthalmia of new-born children; and mention the morbid changes of the Eye which may result from the disease, if unchecked. *State the proper* treatment of the early and acute

stages. Write, in full, any prescriptions that may be required.

5. Describe Ophthalmia Tarsi (Tinea Ciliaris) and its treatment; state also the common effects of neglect or bad management of the early stages of the disease.

6. Give an account of Purulent Ophthalmia, its varieties, causes, and characteristic symptoms, its injurious effects, and the right treatment.

7. What are the appearances, symptoms, distinguishing signs, and effects of acute and chronic inflammation of the Tunica Conjunctiva of the Eye? How would you decide whether the inflammation arises from a local, constitutional, or specific cause? Describe the treatment to be pursued through the different stages of each variety respectively, both in the infant and the adult.

8. Describe the treatment of a Penetrating Wound of the Cornea.

INJURIES AND DISEASES OF THE ABDOMEN.

1. What is an Inguinal Hernia? How does an oblique Inguinal Hernia differ from a direct one, in its relations to the Epigastric Artery and Spermatic Chord? Give the contents of the Hernial Sac, with the various conditions in which they may be found. Detail the symptoms and mode of treatment of an

oblique Strangulated Hernia; and when an operation is required, give the mode of performing it, with the subsequent management of the patient, under favourable or dangerous symptoms.

2. What is a Femoral Hernia? Describe the symptoms and treatment of a Femoral Hernia, when in a strangulated state; and when an operation is required, give the method of performing it, with the subsequent management of the case, up to a favourable, or any other termination.

3. Enumerate the various diseases to which the lower part of the Rectum and Anus are liable; give the method of performing the operation required for a Fistula in Ano, when in a simple or complicated form, with the subsequent treatment of the case according to the symptoms which are likely to arise.

4. Describe the Symptoms and the Treatment of Peritonitis following an operation for Strangulated Hernia. Prescriptions for medicines to be written in full. Give the outline of any illustrative case you may have observed; and if death occurred, state the leading facts of the dissection.

5. What are the diagnostic signs of Ascites, and of Ovarian Dropsy? Describe the operation for Ascites, and mention the precautions to be observed in its performance.

6. Describe the varieties of Inguinal Hernia which occur in association with an open state of the *vaginal process* of the peritoneum in both sexes.

7. State in what cases the operation of Coloton is advisable, and describe the operative procedu methodically.

DISEASES AND INJURIES OF THE FACE AND NOSE.

1. Describe the various Polypi of the Nose, and its communicating cavities, whether of a mild or malignant character; you will give the situation, attachment, appearance, symptoms, and mode of treatment of each variety of Polypus, with the probable termination; you may further illustrate your observations by the details of any cases which may have fallen under your notice.

2. Describe the diseases (not including congenital malformations) which affect the Lips and Tongue, and state the treatment you would adopt for each of them.

3. What different kinds of swellings and tumours may be found in the region at the angle of the Lower Jaw?

4. Describe the symptoms, causes, and treatment of Abscess of the Antrum of Highmore.

INJURIES AND DISEASES OF THE HANDS AND FEET.

1. Describe Onychia Maligna, and its treatment. escriptions to be written in full.

2. Describe the treatment for hæmorrhage from a wound in the Palm of the Hand.

3. Describe the condition of the Foot in *Talipes varus*, the obstacles which oppose its restoration to the normal state, and the measures commonly required for overcoming them.

4. Name the muscles (giving their attachments) by which deformity is produced or maintained in the following affections, viz.—

(1) Talipes equinus; (2) Talipes varus; (3) Talipes valgus.

5. Describe the usual Dislocation of the Thumb at the metacarpo-phalangeal joint; explain the difficulty sometimes experienced in its reduction; and indicate the appropriate treatment of this injury when simple and when compound.

6. What treatment would you adopt in a wound of the Deep Palmar Arch? Give the anatomical reasons which would guide your treatment in the difficulties that may arise.

DISEASES OF THE URINARY ORGANS.

1. Give an outline of the morbid conditions of the Kidney known as 'Bright's Disease.' State how the existence of that disease may be determined during life, and how it is injurious to health, so as to render the performance of a surgical operation unadvisable.

2. What are the pathological conditions which may be produced by a permanent Stricture—(1) upon the urethra behind the Stricture; (2) upon the urinary bladder; (3) upon the kidneys?

3. Describe the changes which may take place in the Prostate Gland of old persons, and the symptoms to which those changes may give rise; and state the treatment you would adopt.

4. State the usual cause of Retention of Urine in a young man, and the method of treatment.

5. Describe the diseases of the Prostate Gland, the changes and symptoms to which it may give rise, and the treatment required.

6. Describe the different kinds of Urinary Calculi, and the appearances which they present, noticing in mixed calculi the order in which the deposits commonly take place, and stating the reasons for the changes in the composition of the concretions.

7. Describe the appearances and composition of the several kinds of Sand and Gravel deposited by the Urine in disease, and the methods by which they may be distinguished from each other; enumerate the causes, symptoms, and mode of treatment of each kind respectively.

8. Give the causes, symptoms and treatment of an inflammatory affection of the Prostate Gland in young subjects; and of a chronic enlargement of the same Gland in more advanced life. Describe fully *your treatment*, both when the urine is retained, as

well as when it is continually dribbling away; and when the disease is in old subjects, terminating in death, you will give the morbid appearances of the parts, which you expect to find, according to the symptoms which you have had to treat.

9. In what different situations may Urinary Calculi be found? Describe the symptoms and treatment to be pursued according to their various positions; and when it is necessary to remove a stone from the bladder, you will give the different operations which have been recommended, saying which you would prefer, with your reasons for such preference. Describe the method of performing the operation which you have selected, with the subsequent management of the case, whether under favourable or dangerous symptoms.

10. Enumerate the symptoms of Stone in the male Bladder; mention other diseases which may produce similar symptoms, and the means which you would employ to determine the real nature of the disease.

11. Describe the effects which Stone in the Bladder produces upon that and upon other organs when allowed to run its course. Briefly describe the lateral operation for Lithotomy and the after treatment; state your reasons for preferring the instrument which you would employ for making the opening into the bladder; mention the most frequent *causes of death after* the operation of Lithotomy.

Describe the operation of Lithotrity, and state the circumstances which would induce you in some cases to prefer Lithotomy to Lithotrity, and *vice versâ.*

12. Describe the treatment which your observation and experience would lead you to adopt for the relief and cure of Permanent Stricture of the Urethra.

13. Mention the causes which may produce Extravasation of Urine into the Perineum; state the direction it takes, and the reason for that direction; state also the local and constitutional symptoms which attend it, and the treatment required.

14. What treatment would you adopt in severe contusion of the male Perineum; in a patient for whom you could pass a catheter into the bladder, and also in another for whom you could not do so? Give reasons for adopting any special method of treatment in each of these conditions.

OPERATIONS.

1. Name the parts which are divided in an operation at the Elbow-joint.

2. Describe the course and relations of the left common Iliac Artery; and the steps of an operation required to secure it.

3. Describe the situation and method of performance of each of the various operations which

may be required for the partial or complete removal of one, or more, of the Tarsal or Metatarsal bones in injuries or diseases of the foot, with the favourable or untoward symptoms which may arise after such operations.

4. Detail the different modes of operating for Cataract, mentioning the one you would prefer, with your reasons for such preference in different cases; give the preparatory and subsequent treatment, both locally and generally, through the various stages, up to the termination of the case, either in a perfect or partial recovery of sight or in total blindness.

5. Describe accurately the successive stages of an operation for Strangulated Femoral Hernia, mentioning the various complications and difficulties which may occur, and how you would meet them. State the causes of fatality in this form of Hernia, and the morbid changes observable after death.

6. Describe, in detail, the steps of the operation for tying the Femoral Artery at the junction of the upper third with the middle third of the Thigh; state the relative position of the parts met with, and mention those to be avoided during the operation. Enumerate the instruments required in the operation.

7. Describe the operations for tapping for Ascites, and for Hydrocele, and the precautions to be observed in these cases.

8. State at which side of the Humerus, after a

circular Amputation through the middle of the left-arm, the principal Divided Arteries are to be looked for, and how bleeding from them is to be hindered. Mention, in detail, how the stump is to be dressed, immediately and subsequently, till it is healed.

9. Describe the operation for Ascites, and mention the precautions to be observed in its performance.

10. Describe Amputation in the Thigh by circular, flap, oval, and rectangular methods; and state which you would prefer, with your reasons for preference.

11. Describe the operations for Stone in the Bladder as performed by Cheselden below the pubis.

12. Name and describe the different kinds of Amputations. State the circumstances under which you would select one kind in preference to any other. Say which operation you would prefer in general, and give your reasons for the preference.

13. Enumerate in their order, from the skin inwards, the parts which are divided in the operation of Lateral Lithotomy; point out any arterial anomalies which may give rise to unexpected or unavoidable hæmorrhage. State what vessels or vascular tissues may be wounded in the operation apart from any anomalies; and point out how best to avoid such hæmorrhage, and how to act when it occurs.

14. Describe the different methods of performing the operation of removing the Arm at the Shoulder

joint, saying which you would prefer, and your reasons for that preference. Note down the anatomy of the parts which you would cut through or expose as you proceed; then give the mode of securing the bleeding vessels, the dressing of the wound, together with the after-treatment of the case, under favourable or unfavourable circumstances, whether from local or constitutional causes.

15. Name the structures which must necessarily be divided or separated in the operation for the removal of the Superior Maxillary Bone.

16. Describe the operation of Amputation at the Ankle-joint; and enumerate the various structures you would divide in their several relations to each other.

17. Describe the course and relations of the Posterior Tibial Artery, from its origin to its bifurcation; and detail the steps of the operation for tying it at the junction of its upper and middle thirds.

18. What are the boundaries of the Crural Arch, and how is it occupied? Describe briefly the principal surgical operations you may be called upon to perform in the immediate neighbourhood of this region.

19. Describe the operation of Amputation at the Hip-joint; and enumerate, in their several relations *to each other*, the parts you would divide, and what *vessels would* require to be secured.

20. Describe the principal methods of performing amputation of the Fore-arm.

21. Describe the operation for the removal of the entire Superior Maxillary Bone; and name the parts divided.

22. Describe the operation of tying the Common Iliac Artery. State by what channels the collateral circulation would be carried on.

23. Describe the operation for Extirpation of the Eyeball; and mention in their order the parts divided.

24. Mention in order the various structures which must be divided in Syme's Amputation at the Ankle-joint.

25. Describe minutely the method of treating fractures of the shaft of the Femur by the extension pulleys, and give your views as to the comparative advantages of that method and treatment by the long splint.

26. Describe methodically the operation of Excision of the Wrist-joint by a single longitudinal incision on the posterior aspect of the joint. Also state briefly the local after-treatment.

27. Describe the operation of Tracheotomy, and state the principal points to be attended to in performing it for the removal of foreign bodies from the air-passages.

a. According to the nature and form of the foreign body;

b. According as it is loose or impacted.
And mention the local treatment of the wound after extraction.

MISCELLANEOUS.

1. Define a *Sinus*; and explain what are the obstacles to its healing. Describe the various modes of treating Sinuses under different circumstances; and give your reasons for adopting any particular method of treatment.

2. Name the different forms of Erysipelas; describe the appearances, symptoms, and progress of Phlegmonous Erysipelas: state the most frequent causes of that disease, also its pathology; mention the principal modes of treatment which are employed, and state those which you should adopt.

3. Sketch the more recent views as to the mode by which pus may be introduced into the blood. Describe the pathological causes, diagnostic symptoms, and treatment of Pyæmia.

4. What is Senile Gangrene? In what parts of the body or extremities does it most commonly show itself? Note the age, habits, and conditions of life of the individuals who are most open to its attack. Describe the symptoms, causes, and treatment of senile gangrene, whether it comes on in a chronic, obscure, or more rapid form, with the probable termination of the case.

5. What is meant by the terms Emphysema, Empyema, Pneumothorax, Hæmathorax? How may each of these be produced by Fracture of the Ribs? What are the physical signs of each of these conditions?

6. Name the Tumours which occur at the Groin; and state how they may be distinguished one from the other.

7. Describe the various forms of Gangrene; the pathological causes, and the appropriate treatment of each kind.

8. Describe Phlegmonous Erysipelas (*e.g.* of the Forearm). State the general and local treatment you would pursue in such a case, and the reasons for your treatment.

9. State the conditions, constitutional and local, which would render amputation expedient for a Compound Fracture of the Leg.

10. State the physical signs of disease of the Lung which would render a surgical operation unadvisable.

11. Describe an Ulcer of the Leg termed 'Varicose;' mention its usual site and its causes; explain how ulceration is induced, and the reasons for the treatment you may adopt for its cure.

12. Name the various diseases found in the axilla; and describe those which you think most common.

13. Describe the local and general causes of death,

of the Primary and Secondary amputations for injury, through the thigh and at the hip-joint, and likewise for simple and malignant disease of the lower extremity. Enumerate the pathological conditions which in your opinion would necessitate the amputations referred to.

14. What is Suppuration? Give your opinion how it occurs; state its various aspects on, or in, different tissues; give a familiar example; state its probable cause, symptoms, progress, and the treatment which you would follow throughout.

15. What is Caries, and what is Necrosis? State the leading distinctions between these diseases, and such minute points as you fancy may lead to a clear diagnosis in each case; describe the treatment of both, and give some illustrated cases.

16. What is Erysipelas? Describe the different kinds which are usually seen, and give the treatment of each.

17. What is Mortification? Give the different names associated with this condition, and explain the meaning you attach to each. Describe the pathology, and give the appropriate treatment, of each form of the disease.

18. What is Delirium Tremens Traumaticum? Under what circumstances is it most likely to occur? Describe the symptoms, and how they are to be distinguished from those of inflammation of the brain;

and mention the proper treatment, under the mildest and most aggravated forms.

19. What is an Ulcer? Describe the processes by which Ulcers are formed and repaired. Give the names and classification of those Ulcers which are found on the surface of the body; describe the appearances and symptoms which enable you to discriminate between the different varieties; write down the mode of treatment to be pursued, both locally and constitutionally of each, whether in a simple or aggravated form. You need not enter on the management of such as are of a syphilitic or cancerous nature.

20. Describe the process of ossification by which the union of a simple or compound fracture of a Cylindrical Bone is accomplished. State the various causes which may not only retard but prevent the union; for instance, of a simple fracture of a Thigh-bone, about its middle third. Enumerate the different modes of the treatment which are employed for the cure of ununited fractures.

21. Give the classification of wounds which arise from external violence; describe the local and general treatment of each variety respectively, whether under favourable or dangerous symptoms; also point out the kind of wounds, and the circumstances generally, in which Erysipelatous Inflammation is likely to come on in such cases.

22. Describe the process of reparation which Nature adopts to unite Fractured Bone, Divided Tendon, Muscle, Nerve, Skin, Mucous and Serous Membrane.

23. Mention the structures which must be divided in the respective operations for Hydrothorax, Ascites Hydrocele, and Fistula in Ano.

24. Describe the Surgical Anatomy of the Sartorius Muscle in reference to deligation of the Femoral Artery.

25. Explain anatomically the course which the blood takes to the lower extremity after the External Iliac Artery has been tied.

26. Describe the situation, extent, and attachments of the Superficial Perineal Fascia. Explain how it limits Extravasation of Urine in certain directions, and allows it to spread in others.

27. State under what circumstances and conditions it may be considered expedient to open the Trachea. Describe the dangers and difficulties of the operation, the method of performing it, and the after-treatment.

28. Name the different causes which may produce obstruction of the Bowels within the abdominal cavity (*i.e.* excluding Hernia); and describe the *post-mortem* condition of the intestinal canal above and below the seat of obstruction. State if any of these affections are remediable by surgical treatment; *and if so, describe* the treatment.

29. How would you distinguish a Burn in which the injured skin is entirely destroyed, and how would you treat it?

30. What is meant by Degeneration? Describe the minute characters presented by its principal forms in those structures in which they most commonly occur.

31. State what you understand by the term Cancer. In the examination of a Tumour recently removed, describe fully the characters by which you would be led to the conclusion that it is Cancer.

32. A man receives a punctured wound in the middle of the anterior part of the Thigh followed by profuse arterial hæmorrhage. The external bleeding is arrested by pressure, but the Thigh becomes rapidly distended and tense. What condition does this indicate? What course is the case likely to take? and what treatment would you adopt for the sequences of this injury at their different stages?

33. A man received a severe kick in the Perineum, which was rapidly followed by considerable swelling there and retention of urine. State the probable nature of the injury and its immediate and remote effects, the mode in which you would investigate such a case, and the treatment you would adopt.

MEDICINE.*

GENERAL DISEASES.

1. Give an outline of the principles on which the treatment of dropsical effusions should be conducted, including the remedies more especially applicable to special forms of Dropsy.

2. What are the more common sources of Pyogenic Fever? Sketch the symptoms which indicate contamination of the blood by Pus; and explain the mode by which it becomes introduced into the circulation.

3. Describe Scirrhus or hard cancer, Encephaloid or soft cancer, and Colloid or gelatiniform cancer, their relations to each other, and their respective peculiarities in reference to seat, symptoms, and course. State the reasons that may be advanced for and against classing epithelial growths with cancer.

4. Under what circumstances does Urea accumulate in the blood? What are the symptoms and results of uræmic poisoning? How is its presence detected?

5. Enumerate the causes under the influence

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* For answers to these questions see the Author's '*Student's Handbook* of the Practice of Medicine.'

of which Hæmatemesis may arise. Explain the sources of the hæmorrhage, and the principles of treatment.

6. Give the symptoms, forms, and treatment of Purpura.

7. Describe the symptoms that denote the entrance of purulent matter into the blood. Give the more probable explanation of the morbid phenomena, including the theory of disseminated abscesses.

8. What are the pathological causes of Albumenuria? Give the tests for its detection, and the sources of fallacy to be guarded against.

9. Sketch the views most generally entertained by modern pathologists of the nature and mode of production of Tubercle.

10. Give an account of the varieties of Cancerous Formations, including their general and microscopic characters. Sketch shortly the arguments in support of the constitutional origin of cancer, and those that have been adduced to prove that it is a local disease.

11. Describe briefly a case of Acute Rheumatism, with the appropriate treatment. Afterwards state the complications which may arise, giving the diagnosis of pericarditis, endocarditis, pleurisy, and pneumonia, or any other complications which you may remember.

12. What are the general and special features of the *Carcinomatous* Cachexia? State in what way

these are modified by the form of the cancer, the organ it affects, and the age of the patient.

13. What are the causes of Muscular Atrophy? How would you distinguish between them in special cases, and in what mode would you treat the affection?

14. What are the forms of Dropsy of the Areolar tissue? Give the diagnosis of the following kinds:—

Dropsy caused—By great feebleness of the heart's action;
By obstruction in certain valves (which must be specified);
By obstruction in *vena cava* inferior (the causes must be given);
By anæmia;
By kidney disease.

15. Give the pathology, symptoms, and treatment of gout.

DISEASES OF THE ORGANS OF RESPIRATION AND OF CIRCULATION.

1. Describe the anatomical characters, physical signs, and results of Cardiac Hypertrophy.

2. Describe the diagnostic symptoms, nature, and treatment of Diphtheritis.

3. Describe the pathological changes to which the Air-tubes are liable.

4. Describe the different kinds of Effusion into the pleural sac, their pathological causes, diagnosis, and treatment.

5. Sketch the anatomical characters and diagnostic signs of Inflammation as it occurs in the tissues of the Lung.

6. Describe the pathological causes of Pulmonary Emphysema.

7. Describe the general and local symptoms of Empyema, its diagnosis, terminations, and treatment.

8. Explain how Pneumo-thorax may arise. Give its physical signs and treatment.

9. Describe the anatomical characters, physical signs, and results of Inflammation of the Pleura.

10. Explain the pathological changes in contraction of the chest after Pleurisy.

11. Describe the diagnostic symptoms, nature, and treatment of Angina Pectoris.

12. Describe the symptoms of Pneumonia, general and local, its anatomical characters, diagnosis, and treatment.

13. Describe the causes, diagnostic symptoms, and treatment of Hydro-pericardium. Explain also how secondary effusions into the pericardium may take place.

14. Enumerate the principal varieties in the Ex-

pectoration in pulmonary diseases. What are the diagnostic indications to be drawn from each?

15. Describe the anatomical characters, diagnostic symptoms and treatment of Laryngitis.

16. Describe briefly the conditions of the Heart (organic and functional) which are accompanied by abnormal sounds.

17. What information as to the condition of the Lungs and Heart is to be obtained by the inspection of the thorax?

18. What are the physical signs detected by auscultation and percussion of Pulmonary Phthisis in the early as well as in the advanced stage? State briefly the mechanism of their production, and their relative diagnostic value.

19. Sketch the treatment of Chronic Pleurisy.

20. Describe the anatomical characters of Fatty Degeneration of the Heart, its etiology, symptoms, secondary lesions, and treatment.

21. By what physical signs do you distinguish Disease of the *right* Auriculo-ventricular orifice obstructing the onward passage of the blood;

Disease of the *right* Auriculo-ventricular orifice permitting regurgitation of the blood from the ventricle into the auricle;

Disease of the *left* Auriculo-ventricular orifice obstructing the onward passage of the blood;

Disease of the *left* Auriculo-ventricular orifice permitting regurgitation of the blood from the ventricle into the auricle;

Disease of the orifice of the Pulmonary Artery obstructing the entrance of the blood;

Disease of the orifice of the Pulmonary Artery preventing its closure;

Disease of the orifice of the Aorta obstructing the entrance of the blood;

Disease of the orifice of the Aorta preventing its closure?

What is the order of frequency with which these lesions of structure occur; and what are their effects severally on the substance and cavities of the heart, and on the other orifices?

22. What are the physical signs and symptoms of Emphysema of the Lungs?

23. What symptoms directly due to derangements of the nervous system accompany and follow Diphtheria? What is the prognosis when such symptoms are present, and how should they be treated?

24. Describe the lesions of structure which affect the arteries, exclusive of aneurism.

25. Explain the nature of Empyema and Hydrothorax respectively, their pathological causes, and treatment.

26. Describe the anatomical characters, diagnostic signs, and causes of pulmonary gangrene.

27. Describe the varieties in the Pulse, and the practical inferences to be deduced from them.

28. Describe the conditions of the Heart (organic and functional) which are accompanied by morbid sounds. Show how they may be distinguished from each other.

29. Describe the causes by which the Heart may be displaced.

30. Mention the circumstances which determine the prognosis in Diseases of the Heart.

31. Describe how Pneumo-thorax may be produced, its signs and treatment.

32. Give the anatomical characters, diagnostic symptoms, and treatment of Pericarditis.

33. What are the more important causes of Pneumonia; in what kind of pneumonia would you bleed; in what give stimulants; and in what expect a favourable termination under simple treatment?

34. Describe the general and local signs of Pneumonia, the changes produced in the lung, and the treatment applicable to its different stages.

35. Describe the results of Pleurisy. Under what circumstances is it advisable to evacuate the fluid by tapping? When a cure is effected, describe the changes that take place in the affected side.

36. Describe the pathological causes and treatment of Pulmonary Hæmorrhage.

37. Describe the physical signs of Pneumonia,

Emphysema, and Pleuritic Effusion respectively, with a view to their differential diagnosis.

38. Describe the anatomical characters, diagnostic symptoms, and progress of Aneurism of the Thoracic Aorta.

39. Describe the more common functional affections of the Heart, their causes, and how they are distinguished from the structural diseases of that organ.

40. Describe the anatomical characters of Inflammation as it occurs in the different tissues of the Lung.

41. Describe the most usual morbid conditions of Arteries. What are the signs and symptoms of Aneurism of the Aorta, seated at the following points:—at the posterior part of the transverse portion of the arch; in the abdomen, just below the diaphragm.

42. Explain how Serous Effusion takes place in Cardiac Dropsy.

43. Sketch the diseases to which the Windpipe (including the Larynx) is liable, with an outline of their treatment.

44. Describe the anatomical characters, causes and consequences of Inflammation of Veins.

45. Describe the anatomical characters of Pulmonary Emphysema, its causes, forms, and physical signs.

46. Describe the complications that occasionally

arise in the progress of Hooping-cough, and the appropriate treatment.

47. Describe the morbid Breath Sounds, their physical causes, and pathological significations.

48. Describe the symptoms attendant on Aneurisms of the Arch of the Aorta.

49. What is the pathological significance of Intermittent Pulse?

50. Give the pathology, symptoms, and treatment of Cynanche Trachealis, or Croup.

51. State the symptoms and treatment of Acute and Chronic Bronchitis. Describe the Chronic Bronchitis of the aged.

52. Describe the anatomical causes of Cyanosis.

53. Give the treatment of Spasmodic Asthma—

a. During the paroxysms.
b. During the intervals.

54. The physical signs, consecutive diseases, and general treatment of Mitral Stenosis.

55. How would you distinguish an Intermittent Pulse, dependent on functional disorder of the heart's action, from that kind connected with structural disease of the heart?

56. The nature and causes of Acute Tuberculosis.

VENEREAL DISEASES.

1. Describe the lesions found after death from

Congenital Syphilis, its symptoms and treatment, and the influence which Father and Mother separately exert on the transmission of the disease to the offspring.

2. Describe the appearance of a lad who is the subject of well-marked inherited Syphilis; also mention some of the complaints amenable to treatment to which he is liable.

3. Give the treatment of Gonorrhœa in the female.

4. Give the pathological appearances of Hunterian Chancre, and mention the best modes of treatment.

5. How would you diagnose hereditary Syphilitic Struma from the non-syphilitic? and how would you treat a case?

DISEASES OF THE URINARY ORGANS.

1. When blood is mixed with Urine, whence may it proceed, and how should it be treated?

2. Describe the anatomical characters, diagnostic symptoms, and results of acute Nephritis. Sketch the treatment.

3. Give the treatment of Convulsions secondary to Bright's Disease.

4. Describe the several varieties of Urinary Deposits. Describe the symptoms accompanying the *passage* of a renal calculus through the ureter.

Sketch the treatment applicable to the lithic, phosphatic, and oxalic diatheses respectively.

5. Sketch the condition of the Urine in Diabetes How is the morbid impregnation supposed to arise By what chemical tests is its presence detected Explain the indications to be observed in the treatment, and measures best adapted to fulfil them.

6. What are the pathological causes of Albuminuria ? Describe the changes which the blood an the urine undergo in the progress of this disease with its secondary affections or complications. Giv an outline of the treatment.

7. Describe the various forms of Inflammation o the Kidneys, their anatomical characters, symptoms and treatment.

8. When blood is discharged by the Urethra mention its sources, and the circumstances which determine the diagnosis.

9. Describe a case of Diabetes, detailing th symptoms and treatment, both medical and dietetical together with the tests for sugar. As far as tim will allow, mention some of the theories as to it nature or causes.

10. Describe the symptoms characterising th passage of a Urinary Calculus into the bladder, an state how you would treat such a case.

11. Detail the treatment of Renal Dropsy in it *early* as well as more advanced stage.

12. Describe the principal morbid conditions c *the Urine and* their treatment.

13. Describe the treatment of Granular Disease of the Kidney, in the early as well as the advanced stage. Mention its more important complications and their management.

14. The diagnosis and treatment of Acute Bright's Disease as determined by the etiology.

DISEASES OF THE SKIN.

1. Enumerate the Diseases of the Skin attended by the development of parasitic vegetable growths; and sketch the diagnostic characters of each. What part does the parasite play in these diseases?

2. Sketch the forms of Syphilitic Diseases of the Skin.

3. Sketch the Pustular Diseases of the Skin.

4. Sketch the characteristic appearances and forms of—1, Ecthyma; 2, Herpes; 3, Lepra.

5. Describe the diagnostic characters, forms, and treatment of Impétigo.

6. Mention the Vesicular Diseases of the skin, and give your treatment for each variety.

7. The varieties of Lichen, the anatomical seat, and the treatment.

8. Mention the commonest forms of Cutaneous Disease of the Scalp in children and their treatment.

9. Describe the varieties of Scabies, as distinguished by the pathological anatomy of the affection, and give the treatment for each variety.

10. Sketch the diagnostic characters, forms, and treatment of Ekzema.

DISEASES OF THE ABDOMEN.

1. Describe the pathological causes of Ascites, and the principles on which its treatment should be conducted.

2. Describe the pathological causes, symptoms, and treatment of effusion into the Peritoneal Cavity.

3. What are the principal diseases of the Peritoneum? State under what circumstances they occur, and give the symptoms.

4. Mention the causes which may give rise to abscess in the Abdominal Parietes, the diagnosis and treatment.

5. State the nature of Phantom or Muscular Tumours occurring in the walls of the abdomen, and mention the chief points of error in diagnosis.

6. Give the diagnosis of Ileus, and the treatment founded on a diagnosis of the causes.

DISEASES OF THE SPLEEN.

Mention the principal diseases to which the Spleen is liable, and how they may be recognised during life. State also the mode of treatment you *would adopt.*

DISEASES OF THE LIVER.

1. Describe the anatomical characters of Cirrhosis. Explain its nature and consequences. Sketch its treatment.

2. Describe the more important structural diseases of the Liver, and the consequences to which they give rise.

3. Describe the morbid conditions which give rise to Enlargement of the Liver.

4. Describe the symptoms characterising the passage of a Gall-stone; and state how you would treat such a case.

5. Give the symptoms and treatment of Inflammation of the Liver.

6. State the pathology, symptoms, and treatment of Jaundice.

7. How would you treat Hepatic Abscess; and what symptoms would lead you to give a favourable prognosis?

DISEASES OF THE PANCREAS.

What are the principal diseases of the Pancreas; and how may they be recognised during life?

DISEASES OF THE ALIMENTARY CANAL.

1. Describe the symptoms of Scirrhous Pylorus,

and state how this lesion is to be distinguished during life from chronic ulcer of the stomach.

2. Describe the various forms of Dyspepsia, including an account of the secondary or remote affections induced by gastric disorders. Give an outline of the treatment.

3. Describe the more important organic Diseases of the Stomach, with the diagnostic symptoms of each.

4. What are the pathological causes of Intestinal Hæmorrhage? Sketch the indications of treatment, and the appropriate remedies.

5. Give an outline of the pathological causes of Intestinal Obstructions, the prognosis and treatment.

6. Describe the phenomena of Ulceration, as it is observed in the sub-diaphragmatic portion of the alimentary canal, pointing out the portions most frequently the seat of this process, with the characteristic symptoms.

7. Where is Stricture of the Colon most likely to occur? What are the symptoms and course? How would you treat it?

8. What are the pathological causes of Diarrhœa? What are the indications to be kept in view in the treatment?

9. Describe the more important organic Diseases of the Stomach, with the diagnostic symptoms of each.

10. Sketch the symptoms, causes, and treatment of Pyrosis.

11. Sketch the secondary affections which have

their origin in Dyspepsia, and their treatment, remedial and dietetic.

12. In an epidemic of Cholera there are other forms of the disease besides the collapse form. Describe the more common forms, and give the treatment.

13. Sketch the anatomical characters, diagnosti symptoms, terminations, and treatment of Inflammations of the Cœcum.

14. Describe the different forms of Angina (inflammations of the throat), their diagnostic symptoms and treatment.

15. What are the varieties of Intussusception of the Intestine found after death, their situation, their anatomical peculiarities, and the lesions of structure which accompany or dispose to their occurrence? Give the symptoms of intussusception, the modes in which it may terminate and its treatment.

16. What are the pathological causes of Ileus? What conclusions have you arrived at as to the probable results of treatment?

17. Describe the anatomical characters of Inflammation of the Digestive Mucous Membrane.

18. Describe the diagnostic symptoms, anatomical characters, and treatment of Dysentery.

19. In what portion of the Intestinal Canal are Ulcerations most frequently found? What symptoms denote that intestinal perforation has taken place? What is desirable under such circumstances?

20. Sketch the pathological causes of Ileus. When a strangulated portion of intestine has been thrown off, describe the mode in which the solution of continuity of the intestine is repaired.

21. Describe the nature, symptoms, and treatment of Acute Colitis.

22. State the more commonly received opinions as to the pathology or nature of Epidemic Cholera. Give the arguments that have been adduced in support of its propagation by contagion. What measures (prophylactic and curative) would you advise should the Epidemic re-appear?

23. Enumerate the circumstances which lead to Obstruction of the Bowels; and describe in detail the diagnosis and treatment of the several forms of obstruction.

24. Describe a case of acute Dysentery, entering fully into its causes, symptoms, complications, treatment, and morbid appearances.

25. State the symptoms of Lead Colic, the diagnosis, and the treatment.

DISEASES OF THE NERVOUS SYSTEM.

1. Sketch the different forms of Palsy, their pathological causes and treatment.

2. Describe the different forms of Apoplectic *Seizures, their pathological* causes, and terminations.

3. Sketch the varieties, causes, and treatment of Headache.

4. Sketch the different forms of Insanity. How is Mania to be distinguished from febrile delirium, or from delirium tremens?

5. Describe the morbid appearances in the Brain in fatal Apoplexy.

6. Describe the anatomical characters, diagnostic symptoms and treatment of acute Hydrocephalus.

7. Describe the different forms of Softening of the Brain, their anatomical characters, symptoms, etiology, and treatment.

8. What are the symptoms of Paralysis of the Seventh pair or *facial nerves?* What circumstances influence the prognosis in paralysis of one facial nerve? How should it be treated?

9. Describe the diagnostic symptoms, forms, pathological causes, and treatment of Tetanus.

10. Mention the situations in which Intra-cranial Hæmorrhage may take place. When the hæmorrhage occurs in the cerebral tissue, describe the progressive changes which take place during the process of reparation.

11. Describe the anatomical characters of Cerebral Softening. Sketch the symptoms, tracing them from the early to the advanced stage of the disease.

12. Explain how Facial Palsy is to be distinguished from palsy of the face arising from cerebral disease.

13. Describe the different forms of Chorea, with the various plans of treatment that have been recommended.

14. Distinguish Narcotic Poisoning from apoplexy, and other cerebral diseases accompanied by coma.

15. Describe the nature, varieties, morbid appearances, and treatment of Epilepsy.

16. Enumerate the forms of Insanity. Sketch the characteristic features and progress of paralytic insanity (general paralysis of the insane).

17. Describe the anatomical characters, symptoms, and results of Intra-cranial Hæmorrhage.

18. Describe a case of General Paralysis of the Insane, from its commencement to its close, giving the symptoms, causes, duration and *post-mortem* appearances.

19. Describe the Intra-cranial Lesions which give rise to Paralysis.

20. Describe the pathological causes of Facial Palsy.

21. Contrast the diagnostic characters of Arachnitis, acute Mania, and Delirium Tremens. Describe the treatment applicable to each.

22. What are the indications to be kept in view in the treatment of a sudden Apoplectic Seizure? In determining the question of blood-letting, contrast the circumstances which indicate its expediency, with those which render its adoption doubtful if not *hazardous.*

23. Describe the diseases to which the Spinal Cord is liable. Give the diagnostic symptoms and treatment of each.

24. Sketch the various forms which Hysteria assumes, and show how the diseases it simulates may be distinguished.

25. Describe the symptoms, course, and *post-mortem* appearances of Locomotor Ataxy.

26. What do you understand by the term 'Hypochondriasis;' and how is it to be distinguished from Insanity on one hand, and the effects of Disease of the Viscera on the other?

27. What are the symptoms of Concussion of the Spine, and what symptoms would lead you to form a favourable or unfavourable prognosis as to its issue.

28. Give a full account of the disease known as Cerebro-spinal Meningitis.

29. Describe the anatomical appearances of Red Softening affecting the left Corpus Striatum and optic Thalamus; and give a sketch of the probable symptoms in such a case.

30. What is meant by Hemiplegia, Paraplegia, and Locomotor Ataxy? Describe the symptoms of each disease, and the morbid conditions upon which they depend.

31. The diagnosis of Abscess of the Brain.

FEVERS.

1. Describe the varieties, complications, and treatment of Small-pox.

2. Describe the distinctive characters, progress and treatment of Abdominal Typhus.

3. Give an outline of the forms, pathological causes, and treatment of Puerperal Fevers.

4. Give an outline of the pathology and treatment of Scarlatinal Dropsy.

5. What are the chief causes of death in Scarlet Fever? Give an outline of its treatment.

6. Describe the symptoms, anatomical characters, and treatment (remedial and dietetic), of Infantile Remittent Fever.

7. Describe the forms and treatment of Erysipelas. Mention the grounds on which it has been supposed to originate from contagion, with such facts in illustration as may have come under your observation.

8. Describe the lesions that arise in the progress of Enteric (Typhoid) Fever, and explain in what respects this form differs from ordinary typhus.

9. Describe the symptoms, causes, and treatment of Gastric Remittent Fever.

10. Sketch the more important secondary diseases that occur in the progress of Continued Fever.

11. Give a short account of Scarlet Fever, and its varieties; your treatment of particular cases of the

disease, and the method you would adopt to prevent its propagation.

12. State the treatment appropriate to the successive stages of Small-pox. What local means would you use to prevent pitting?

13. Mention also the chief sources of danger, and give an outline of the treatment of confluent Small-pox.

14. Contrast the symptoms of Typhus Fever, Typhoid Fever, acute Tuberculosis, Pyæmia, and Trichinosis, with a view to diagnosis. Give an account of the mode of production of the disease produced by the wanderings of the Trichinæ; and state how its occurrence should be prevented.

15. What are the more commonly received opinions as to the nature or pathology of Continued Fever? Describe (shortly) the varieties or forms, and in what circumstances they respectively differ. Give an outline of their treatment.

16. Sketch the pathological causes, symptoms, and treatment of Infantile Gastric Fever.

17. Distinguish between Erythema and Erysipelas, as to causes, symptoms, and course.

18. What are the principal distinctive symptoms of Typhoid (Enteric) Fever and Typhus.

MISCELLANEOUS.

1. What meanings do you attach to the terms Cachexia and Diathesis? Illustrate your definitions by examples; and discuss, as fully as time may permit, the various opinions held of late years on the origin of the diseases you select as examples.

2. Describe the process of Purulent Formations, with examples in illustration. Explain the supposed origin of purulent deposits in organs. Sketch the symptoms and progress of Purulent Infection.

3. Describe Exudative Inflammation as it occurs in the Air-passages.

4. Describe the pathology of Congestion, and explain in what circumstances it differs from Inflammation. Mention its principal causes, and give examples in illustration.

5. Define the term Mortification. Describe generally its phenomena, and explain the circumstances under which it may arise in the different tissues and organs, giving examples in illustration.

6. Contrast the diseases in which the administration of Opium is beneficial, with those in which its employment is either doubtful or contra-indicated.

7. You are called to a patient bringing up blood from the lungs or stomach. State what the different causes of the Hæmorrhage may be, and how you would treat each particular variety of it.

8. What are the principal distinguishing signs of

enlargement or tumour of the Liver; of the Spleen; of the Kidney; of the Ovary; and of the Uterus?

9. Supposing you are called to a patient who has been suddenly taken ill and is entirely unconscious. What are the different conditions upon which his state may depend; and how would you distinguish them?

10. In what diseases may albumen and blood in the Urine occur together or separately? How would you treat the respective cases?

11. A person is suddenly seized with violent pain in the Abdomen, rapidly followed by sickness and vomiting. What are the various forms of affection which such an attack may indicate; how would you distinguish each form; and what treatment would you have recourse to for its relief?

12. Illustrate by special examples the use of the Thermometer in the diagnosis of disease.

13. Enumerate the various causes of Dyspnœa, and state the grounds upon which, in particular instances, you would base your discrimination among these causes.

14. What are the commonest causes of Vomiting? Give the treatment of each particular variety.

15. What are the conditions, both remote and immediate, of 'Loss of Consciousness,' as a symptom of disease? Describe the process of diagnosis among these conditions.

16. Contrast the following forms of disease:—

Infantile, Diphtheritic, and Saturnine Paralysis; Progressive Muscular Atrophy (wasting palsy); and Locomotor Ataxy.

17. Define and illustrate by description the following terms used by different writers on Auscultation; Puerile Respiration, Supplementary Respiration; Large Crepitation, Small Crepitation; Crepitant Râle; Large and Small Crackling; Muco-crepitation, Mucous Râle, Gurgling; Amphoric Gurgling.

18. What do you mean by the term Fever, used in its abstract sense to indicate a state accompanying many diseases? What are supposed to be the internal conditions giving rise to it.

19. Mention the different remedies which may be used to check Diarrhœa, and to allay sickness and vomiting, giving the doses and forms in which they should be employed.

20. Mention some of the more common aperient medicines contained in the Pharmacopœia. Write a prescription for an appropriate purge in Renal Dropsy; another for an occasional pill in Chronic Hepatic Disease, and a third for a medicine suitable for habitual Constipation in a young female.

MIDWIFERY.

1. Describe the diagnosis, causes, and treatment of Spurious Pains.

2. In a patient prone to severe Hæmorrhage after the birth of a child, what prophylactic measures would you adopt?

3. Enumerate the causes, and describe the treatment of Puerperal Convulsions.

4. Describe the difficulties which are met with in the operation of Turning, and the most appropriate means for obviating them.

5. Describe the various forms in which Occlusion of the Os Uteri is found at the end of Pregnancy; and how would you treat them?

6. Describe the mechanism of Natural Labour in occipito-anterior positions of the head.

7. Describe the ordinary derangements of health connected with Pregnancy, and their treatment.

8. Enumerate the changes in the breast produced by Pregnancy.

9. What are the indications of commencing Labour?

10. What are the symptoms during labour which would lead you to the conclusion that the Pelvis is contracted in its antero-posterior diameter?

11. Describe the different species of deformed Pelvis.

12. Describe the symptoms, causes, and treatment of Prolapsus of the Funis.

13. Describe the causes and treatment of retained Placenta.

14. Enumerate the sources of danger to mother and child in Precipitate Labour.

15. Enumerate the symptoms of Pregnancy; and then state which are the certain, and which the uncertain ones.

16. Describe the last stage of Natural Labour, and your management of it.

17. Enumerate the indications for using, and the rules for applying the Forceps.

18. Describe the various forms of Contracted Pelvis.

19. What are the contra-indications to the use of chloroform during Labour, and how would you obviate them?

20. What is the difference between the effects produced by partial and those produced by complete Prolapsus Uteri?

21. What are the causes and treatment of faulty uterine action during Labour?

22. Enumerate the signs of the child's death before birth.

23. What are the indications for Perforating the

child's head, and the rules for performing this operation?

24. Enumerate the rules for performing the operation of Turning, and state the reasons for their being observed.

25. Describe the symptoms of Malignant Puerperal Fever, its causes and treatment.

26. What is the treatment in the Asphyxia of new-born children?

27. Describe the course of the head through the Pelvis in the most frequent cases of Face-presentation.

28. Enumerate the different causes of the death of the Fœtus in Labour.

29. In what circumstances does Rupture of the Uterus in Labour most frequently occur? What light does Morbid Anatomy throw on the accident? What are its symptoms, and what is its appropriate treatment?

30. When the head is in the First Position, what is meant by the terms Obliquity, Flexion, Rotation, Extension, and Restitution?

31. Describe the operation of Turning in a case of Arm-presentation; mention the stage of Labour at which it should be performed; and state the advantages of bringing down one or both feet.

32. What are the precautions to be observed in the administration of Ergot during Labour.

33. On what diseases of the Mother, and on what of the Ovum, does Abortion most frequently depend? Give a description of the latter.

34. Describe the changes produced in the Pelvis by Mollities Ossium; explain their mode of production, and contrast them with those which are usually occasioned by Rickets.

35. Enumerate the causes, and describe the symptoms and appropriate treatment, of Labour delayed in its first stage.

36. Describe the principal methods of inducing Premature Labour.

37. What are the ordinary sources of the origin of Puerperal Fever by Contagion and Infection?

38. Describe the chief modes of treatment of Ovarian Dropsy, and the conditions in which they may be respectively resorted to.

39. State the symptoms, diagnosis, and treatment of Pelvic Cellulitis.

40. What are the conditions as regards the safety of the mother, or fœtus, or both, in which Premature Labour should be induced?

41. Describe the passage of the fœtal head through the pelvis, in Natural Labour with the head in the first position.

42. What signs would lead you to suspect the presence of Albumenuria in Pregnancy? And what *treatment* would you adopt in such cases?

43. What is meant by a Transverse Presentation?

How is labour in such cases sometimes terminated by nature, and what are the rules to be observed in having recourse to manual interference?

44. In protracted second stage of labour, what circumstances call for the employment of Instruments; and how would you determine whether to apply the forceps or to perform craniotomy?

45. Describe the anatomical characters of Fibrous Tumour of the Uterus; and state the symptoms by which it is ordinarily attended.

46. Describe the changes which Rickets produce in the Pelvis, and the manner in which they are brought about.

47. Give the cause of Sudden Death in the puerperal state; and describe the chief pathological conditions found in such cases.

48. Describe the symptoms of unavoidable Hæmorrhage in Labour; and detail the treatment which in different circumstances is applicable in that condition.

49. Mention the symptoms which would indicate Dropsy of the Amnion; and state if any peculiar morbid condition is often met with in the fœtus in cases of this kind.

50. Give the diagnosis of Ovarian Dropsy, and state especially how it is to be distinguished from pregnancy, fibrous tumour, and ascites.

51. What are the symptoms of Cancer of the Uterus; and how would you distinguish between it

and other forms of uterine disease with which it is sometimes confounded.

52. Describe the mode of making an external and internal manual examination of the Uterus. What points can be determined by such exploration?

53. Give the mechanism of Face Presentations, with their diagnosis, prognosis, and treatment.

54. Enumerate the pathological conditions which give rise to Amenorrhœa.

55. What are the causes and treatment of Retention of the Placenta after birth of the child at full term?

56. Under what circumstances would you consider it desirable to employ the Long Forceps; and what precautions is it necessary to observe in using them?

57. Into what points is it necessary to inquire in determining as to the satisfactory progress of a woman during the first week after delivery.

58. At what periods of pregnancy is Premature Expulsion most frequent, and when is it most dangerous? Give your reasons.

59. Enumerate the different means of stopping Hæmorrhage before labour.

60. What are the various difficulties and dangers which we are liable to meet with during the last stage of labour?

61. Enumerate the causes of Menorrhagia.

62. In presentation of the Cord, what are the

circumstances which would direct you, either to leave the case to nature, to apply the forceps, or to turn the child?

63. Describe the object and modes of inducing artificial Premature Labour.

64. Describe Phlegmasia Dolens.

65. Describe the contents of the Gravid Uterus at the third month.

66. What are the pathological conditions which give rise to Uterine Hæmorrhage in the unimpregnated uterus?

67. State the type of Anatomical Union between the pregnant uterus and the placenta, and the probable sources of the bleeding in unavoidable and accidental hæmorrhages.

68. Give the causes and treatment of Inversion of the Uterus in its acute and in its chronic forms.

69. Describe the various Sympathetic Affections produced by pregnancy, their nature and treatment.

70. Describe the symptoms, causes, and treatment of After-pains.

71. Enumerate the advantages of putting the child early to the breast.

72. In threatened Premature Expulsion with hæmorrhage, how would you stop the discharge when it occurs in the first half, and when it occurs in the second half of pregnancy? Give the reasons for your treatment.

73. In threatened Abortion, what may we infer

from the fact of the discharge preceding the pain, and what when the pain precedes the discharge?

74. Give the diagnosis between Retroversion (during pregnancy), Inversion, Prolapsus, and Polypus of the Uterus.

75. Describe the condition of a patient in the last month of pregnancy (as regards her general health, size of uterus, &c.), and the indications for treating her, especially with reference to the labour and the puerperal state.

76. Under what circumstances is it justifiable to Rupture the Membranes?

77. Describe the operation of Perforation, and the different Perforators most commonly used.

78. What is understood by 'Hour-glass Contraction of the Uterus?' What dangerous conditions is it commonly associated with, and what will be the treatment?

79. Describe the phenomena of Pregnancy in the third, sixth, and ninth months.

80. What is the Diagnosis of a face, a nates, and an arm or shoulder presentation during the early stage of labour?

81. What treatment and precautions would you adopt previous to and after labour, with a view to prevent Hæmorrhage after the birth of the child?

82. Describe the symptoms, causes, and treatment of Retroversion during pregnancy.

83. What are the different species of Asphyxia *so-natorum, their* diagnosis and treatment?

84. Describe the changes which the Uterus undergoes during the different months of pregnancy, as shown by external and vaginal examination.

85. In a case of difficult labour with the head presenting, state the reasons which will justify your attempting to deliver with the Forceps, and also those which would forbid the forceps and require the Perforator.

86. What is the condition of the Vagina in prolapsus, inversion, and retroversion of the uterus?

87. In Placenta Prævia state the circumstances which will render turning necessary; those which will justify the use of the forceps; and those in which you may allow the Labour to proceed without interference.

88. A woman, not pregnant, is seized with severe pain of the back, extending round the pelvis, violent bearing down efforts, hæmorrhage, &c. The vagina is occupied with a fleshy tumour which has descended nearly to the os externum. What may that Tumour be? Give the diagnosis of the different conditions which correspond to the above symptoms, and their treatment.

89. In what direction must the Catheter be passed in partial prolapsus of the uterus, complete prolapsus, retroversion and inversion?

90. Describe the treatment of Hæmorrhage arising from uncontracted uterus after Labour.

91. Describe the situation, form, &c., of the Os

Uteri at the commencement of Labour in a primipara and a multipara.

92. A primipara has had pains for some hours; the head presents—the Os Uteri is barely half-dilated—its edge thin—the pains are feeble and ineffective—she is becoming exhausted from suffering and want of rest. What are the points to be ascertained as indications of treatment?

93. What are the symptoms in threatened Abortion which justify your not attempting the process of expulsion, and those which require you to promote it?

94. Enumerate the symptoms and describe the progress of Labour when the antero-posterior diameter of the pelvis is contracted.

95. State what is known concerning the pathological condition called 'Spurious Pregnancy;' and point out the distinctions between it and other affections for which it may be mistaken.

96. Describe the different forms of Dysmenorrhœa, and the morbid changes with which they are associated.

97. What are the various Displacements of the Uterus? How do they affect Pregnancy and Labour? What remedial methods are recommended in displacements of the Gravid Uterus.

98. Describe a Labour-Pain in the expulsion stage, with its accompanying phenomena.

99. What is the duration of Pregnancy in the human female? What explanations have been suggested to account for its spontaneous termination at the ordinary period?

100. What symptoms would lead you to suspect that the Fœtus was dead *in utero?*

101. How far is it necessary to interfere in Breech Presentations? In what way may risk to the child be increased by injudicious management?

102. What are the symptoms of Chronic Inversion of the Uterus? How would you distinguish between Inversion and Polypus of the Uterus?

103. Describe minutely the structure of an Ovum expelled from the Uterus at the termination of the third month of utero-gestation; and state how you would determine the period of its development.

104. In endeavouring to deliver the Fœtal Head arrested at the brim of the pelvis, what are the relative advantages of Forceps, Turning, and Craniotomy? What circumstances would influence you in the selection of the operation?

105. From what causes may Fœtal Life be imperilled during parturition? How would you endeavour to counteract them?

106. State what is known concerning Obstruction of the Arteries in connection with the puerperal state.

107. From what causes may the *os uteri* be so displaced upwards above the symphysis pubis as to

render examination necessary? Give the differential diagnosis between them.

108. For what conditions may retroverted Uterus at the third month of pregnancy be mistaken? How is the diagnosis to be made?

109. What are the causes which give rise to Retention of Urine in the adult female? What other forms of swelling may be mistaken for a distended bladder, and how is the distinction to be made?

110. What are the measurements of the normal Female Pelvis? In what respects does Rachitic pelvis differ from that produced by Malacostion; and how does the difference affect our power of rendering efficient service during labour?

111. Describe the various uses of the Uterine Sound; the mode of its introduction, with the caution to be observed; and the nature of the information to be derived from its employment in various cases.

112. Describe the operation of Cæsarian Section; indicate the nature of cases requiring it, and the circumstances regulating the time for operating.

113. What is known of the pathology of Puerperal Eclampsia?

114. Give what information you possess concerning the causes, symptoms, and diagnosis of an Effusion of Blood into the Retro-uterine Pouch of the Peritoneum, or into the Cellular Tissue surrounding the Womb.

115. How would you distinguish malignant dis-

ease of the *cervix uteri*, from simple granular inflammation of the organ?

116. Describe the condition of the Uterus after delivery, and the changes which take place in it during the convalescence of a puerperal patient.

117. What is Leucorrhœa? State the pathological conditions which give rise to it.

118. Describe the forms of Ovarian Tumour, with their diagnosis. What modes of treatment are employed in their different stages?

119. Give a concise account of the opinions which have been held concerning the anatomy of the Placenta. In what does the human placenta differ from other placentæ, according to the Hunterian theory?

120. What are the symptoms, terminations, and treatment of Tubal Gestation.

121. What are Fibrous Tumours of the uterus? Describe their seat, their structure, and the changes which they undergo, also the symptoms to which they give rise, and the means of distinguishing between them and tumours of the ovaries.

122. Mention the peculiarities met with, as regards progress, in cases of labour with Twins, the means of diagnosis, and the management of the birth of the second child.

123. What information is to be gained in Uterine Diagnosis by the sense of touch—1, unaided; 2, aided by the sound, tent and exploring needle?

124. Enumerate the local impeding causes which may produce Protraction of the First Stage of Labour, and describe the management of a case where there is Rigidity of the Lips and Neck of the Uterus.

125. Give the diagnosis and the treatment of Retroversion of the Unimpregnated Uterus.

126. Give the causes, diagnosis, and treatment of Hæmorrhage in the Third Stage of Labour.

127. State the causes, on the part of the child, of Protracted Labour in the Second Stage, and give the management of a case of Protracted Second Stage from Hydrocephalus.

128. Give the symptoms, diagnosis, and differential diagnosis of Fibroid Tumours of the Uterus.

STATE MEDICINE.

1. There is a family of six or more individuals—one member of it sickens, and has an essential fever; another takes ill, and so on successively the whole are attacked: are the cases necessarily of the same type or nature? May we have under the circumstances different forms and complications of disease?

2. How do you hold that sanitary measures act beneficially? Is it by direct prevention of disease by influencing the condition of receptivity of disease in the individual, or by improvement of the health of the community?

3. How far can you depend on the death rate of a district in judging of its salubrity or insalubrity, or the health and vigour of its inhabitants?

4. How far is the history of cholera in Europe confirmatory of, or opposed to, the doctrine of its contagious nature?

5. What are the views as to the causes of epidemics expressed by Humboldt in his 'Cosmos'?

6. What considerations, besides the results of chemical analysis of the food, should guide you in judging of the fitness or unfitness of a prison dietary?

7. Give the views of Dr. Murchison as to the contagious nature of typhoid fever.

8. An individual has died of some acute essential disease—say fever or cholera—how far do you hold that disease of a similar nature may be communicable by the dead body?

9. Has any relation been observed between the occurrence of epiphytic and epizootic disease and epidemical disease?

10. Is the offensive odour from the River Liffey a cause of increased sickness or mortality among the inhabitants of houses along our quays?

11. Can you offer any explanation as to why malaria, productive of intermittent fever, is not observed in the bog districts of Ireland?

12. The filtering powers of the lung, by which putrefying and morbific germs in the air are supposed to be intercepted, is referred to in explanation of the non-putrefying of blood effused in the pleura. Do you know of any case in which air has free and long-continued access to a collection of highly animalised fluid in the chest, yet in which putrefaction is the exception and not the rule?

13. Many cases of a disease very similar to yellow fever occurred in Dublin in 1829 and 1830: can you describe the symptoms, and give the *post mortem* appearances.

14. Sir Gilbert Blane has specified a cause of *mortality in the* British Army in Spain more pro-

ductive of death than all others, including the sword.

15. In estimating the salubrity of an hospital, which is the question as to the cubic space given for each inmate, or the amount of ventilation, the most important?

16. Does continued fever in this country occur as an endemic as well as an epidemic disease? In which form is it most frequently met with? Is it or is it not independent of contagion?

17. Give the derivation of the term 'zymotic' as applied to essential disease.

18. State the relation of zymotic disease, so called, to fevers. May it exist independently of fever and of periodicity?

19. What maladies may be placed in the category of preventible diseases? Are the eruptive as well as the continued fevers to be so classed; if so, in what cases?

20. Are acute preventible diseases always contagious in acute essential affections?

21. In what class would you place cholera? Preventible or unpreventible? How does it resemble fever?

22. What is the supposed cause of trismus nascentium? Is it local or general? Preventible or non-preventible? Why has it been called the 'nine-day-fits'?

23. What is meant by the terms: contagious,

infectious, zymotic, malignant, essential, febrile, continued, remitting, epidemic, endemic, periodic, and preventible, as applied to disease?

24. With reference to affections of the brain in typhus fever, what is the class of society most liable to such accidents? How far do they imply cerebritis or consequent mania?

25. In severe epidemics of the plague, it has been sometimes the practice to surround the infected city with a cordon of troops, and prevent the inhabitants from quitting it. How far is such a measure judicious?

26. What is the supposed difference in duration between the latent periods of variola, measles, scarlatina, the plague, and hydrophobia?

27. How far do contagions act more violently in districts where they have not appeared for a considerable time? Does the previous state of good health and of bodily vigour affect the result?

28. What are the epidemics which are observed to co-exist in tropical countries?

29. Is there any relation between their respective mortalities?

30. Are the progression and decline of great epidemics, such as fever, small-pox, and cholera, subject to the same general laws?

31. State your views as to the possibility, by [illegible]*tion* and sanitation, of assimilating the type of [illegible]*al disease in all* classes of the community.

32. Show why the death rate fails in establishing the salubrity or insalubrity of a country or a district.

33. State the true principle of sanitary legislation as announced by Dr. Acland.

34. What is meant by personal, public, national, and comparative national health ?

35. How far is public education related to measures of State Medicine ?

36. Do sanitary measures act beneficially in extinguishing disease at its source, or do they, by improving the general health of a population, render its advent less harmful, whether as to the numbers affected or the type and violence of disease ?

37. State the best means of attaining an improved registration of births and deaths in this country.

38. What is your opinion as to the importance and feasibility of carrying out a registration of sickness ?

39. Give examples of the geographical distribution of disease. How far has it been constant ?

40. State briefly what special medical arrangements you would advise for the management of a cholera epidemic in a given locality.

LAW.

1. Give a brief summary of the medical and legal tests of criminal responsibility in cases of homicidal mania.

2. State the rules by which a medical jurist should be guided in drawing up a medico-legal report.

3. State the steps required by Law to be taken before consigning a person of unsound mind to a private Lunatic Asylum.

4. Point out the principal duties which would devolve upon a Medical Officer of Public Health under an enlightened Sanitary Code.

5. Give some account of the present state of the Law with regard to Common Nuisances so far as they affect the Public Health.

6. State the elementary principles and rules of the Law of Evidence.

7. What is the difference between *Common Nuisances* and *Private Nuisances?* State the principal Common Nuisances.

8. Describe some of the Nuisances which are prohibited under *penalties.* State the different nature of the penalties under which they are prohibited. How are the pecuniary penalties recoverable?

9. What is the nature of an *Injunction?* How is it obtained? What is the nature of a *Bill and Information?*

10. What is a Watercourse in the legal sense? What are the rights of the riparian proprietors? State some of the violations to which such rights are *exposed.*

11. Are medical books admissible as evidence?

How far are the opinions of medical witnesses receivable? What are the rules which a medical witness should propose to himself and observe under examination or cross-examination?

12. What is a *Highway?* To whom does the soil of a highway presumably belong? What are the principal offences of which highways may be made the subject?

13. State anything you know about the Law relating to Sewers.

14. Enumerate the different statutes now in force which constitute the Irish Sanitary Law.

15. State the various trades, businesses, or manufactures that are regarded as noxious in the Statutes; and state the duty of a medical officer in case such noxious trades should be a nuisance.

16. What are the principal powers which exist for the prevention of disease? In whom are those powers vested? And on what fund are the expenses to be charged?

17. What does the word 'Nuisance,' under the Acts now in force in Ireland, include?

18. If any sanitary authority should neglect the performance of its duty, how, and under what conditions, is such performance to be expressed?

19. How is a sewer authority to protect a Watercourse within its jurisdiction from pollution?

20. Give an account of the constitution and functions of the Local Government Board.

21. Distinguish between a nuisance at Common Law and a nuisance in the Nuisances Removal Acts.

22. What is the object aimed at by the Alkali Acts?

23. What is meant by 'Local Authority'? How is the Local Authority constituted in urban and rural districts respectively?

24. What remedy does the law provide for the case of a Local Authority refusing or neglecting to remedy a measure which has been complained of?

HYGIENE.

1. What are the requirements of the economy that food has to meet?

2. What are the considerations that the construction of dietaries involves, with respect to age, sex, constitution, occupation, climate.

3. What are the epidemics that have at various times visited Ireland; amongst which one has been so frequent in its visits that it might almost be regarded as endemic; and to what may this frequency of its visits be ascribed?

4. Are hospitals a necessity? What are their advantages, and what their disadvantages? If we [illegible]pare the results of fever cases in this country in [illegible]*-48, which, if* not left in the open air, were at

least in the rudest huts, with cases similarly affected that had all the advantages of the best hospitals, does the comparison tell in favour of or against hospitals?

5. What are the diseases which nearly all surgeons admit would almost be better treated in the open air.

6. What are the conditions, according to Pettenkofer, that are requisite in order that cholera spread as an epidemic in a locality?

7. To what extent is the recent small-pox epidemic calculated to affect our confidence in the protective efficacy of vaccination?

8. Are we to suppose that its protective efficacy has but a limited duration, and that vaccination needs to be renewed?

9. What are the arguments for and what against revaccination?

10. What injurious consequences have attended revaccination?

11. Can we assign any reason why small-pox, when vaccination has not been performed, should run a longer course than when it has been performed; why, in fact, there should be secondary fever in the one case and not in the other?

12. What is the dietetic value of alcohol?

13. Under what influences do zymotic diseases especially arise?

14. How do malaria and miasmata differ from

each other, and what are the different pathological effects of each ?

15. Enumerate the principal diseases incidental to trades and professions.

16. Under what circumstances have sulphuretted hydrogen and cyanogen destroyed human life ? What are their physiological actions ?

17. Mention the surgical diseases which have been known to spread in close hospitals.

18. State the advantages of M'Kinnell's or the double-tube ventilator.

19. What methods of purifying coal-gas are most and least hurtful to those living near ?

20. State briefly the results of chronic alcoholic intoxication.

21. What conditions render flesh meat dangerous food ?

22. In the district north-west of Trinity College what diseases prevailed during last century, and what now replace them ?

23. If cholera were epidemic in Liverpool, why should quarantine be impracticable in Dublin ?

24. In what cases respectively are carbolic acid, sulphate of iron, sulphurous acid, and a high temperature, the best disinfectants ?

25. What symptoms do mirror-makers usually suffer, and how may they be completely or partially prevented ?

26. Can the poison of typhoid fever arise from fæcal decomposition, or is the presence of a

specific element derived from the body of a sick person essential? Discuss this question as fully as you can.

27. Besides typhoid fever, what other diseases are supposed to spread by infection contained in the fæces of the sick?

28. How, according to Pettenkofer, is the spread of cholera and typhoid fever influenced by variations in the level of the sub-soil water? Besides these variations, what else does he suppose necessary to induce an outbreak of the disease? What support has his theory received from other observers?

29. What are the diseases in the treatment of which a very large supply of fresh air is most essential?

30. In air vitiated by respiration, what is the injurious element? State the reasons for your answer.

31. What would you consider the minimum cubic space necessary per head for healthy persons? What for sick persons? How often, on these estimates, should the air be changed each hour?

32. Enumerate the principal diseases contracted by men from the lower animals.

33. What is the effect produced on the body by an excess of nitrogenous food?

34. What is the '*caisson disease*'? Give the chief symptoms.

35. What are the most common means by which lead finds an entrance into the body? Give the symptoms of chronic lead poisoning.

ENGINEERING.

1. If called upon to report on a scheme for a proposed supply of water to a town of 90,000 inhabitants, and being provided with the Ordnance sheets of that part of the country, explain how you would, without walking over the whole district, 1st, Ascertain the limit of the rain basin of the stream down to the point at which it was to be impounded. 2nd. How you would, from the map, take out the area (either in square miles or acres) bounded as above. 3rd. State the circumstances which would guide you in forming an opinion as to the *available* volume of water from the rainfall, taking into account the geological and physical structure of the district. 4th. What daily supply, and volume in the storeage reservoir, would you consider necessary for the above population?

2. Describe the construction of Rain Gauges, as, for instance, that devised by Mr. Bateman for examination every two or three months, that adapted for daily examination, and that for measuring short storms of violent rain. What practical points should be attended to in placing them and setting them up?

3. If you could only obtain a few months to make actual measurements of the rainfall in a district, *how* would it be possible to determine a reliable *yearly average* from comparisons with records kept

for many previous years, at a proximate gauge, whether more or less elevated than that you require to ascertain; as, for instance, the manner in which Mr. Bateman deduced the average rainfall of the upper districts of the Liffey from the gauge in the Phœnix Park?

4. The promoters of a Water Bill, recently before a Parliamentary Committee, defended themselves under the allegation that they proposed to give a very hard water to the inhabitants they intended to supply, by placing in evidence a Table purporting to give the mortality in various towns, distinguishing between those supplied with water above and below ten degrees of hardness (Dr. Clark's test). It appeared that in eleven towns (such as Leamington, Southport, Croydon, and Cheltenham), in which the average hardness of the supply was 14·9, the mortality was 22·2 per thousand; while in those having water under ten degrees (such as Liverpool, Sheffield, Glasgow, and Manchester), the mortality was 26·1 per thousand. Examine the fairness, or otherwise, of this comparison, and show that the prejudice against soft water is unfounded; either giving your own or Mr. Bateman's arguments in reply.

5. Describe the operations for improving the sewers in Dublin during the last five or six years, and the general features of the plan of Messrs. Neville and Bazalgette, now before Parliament, for the main drainage of the city and townships, and

give your views of the probability of the successful application of the sewage. What is the commercial value per ton of the sewage of large towns, according to different authors?

6. Mr. Baldwin Latham enumerates the following methods, to which all others may be reduced, by which sewage may be distributed over lands:—1, Subterranean irrigation; 2, Under-ground pipes, and hose-and-jet distribution; 3, Surface-channels; 4, By submersion. State in what countries, and how, these have been employed, with the advantages, or otherwise, attributed to them respectively.

7. State the volume of space per man ordered in India and at Home in new barracks, and the height of rooms recommended, and hence deduce the superficial area per man, and best proportions of a room for twenty-four soldiers. What rule has been given for the area of shafts for ventilation in India? In troop-ships what cubical space per man should be given?

8. Describe the various methods proposed for the purpose of ventilating sewers, and point out the difficulties that beset the mechanical exhaustion of foul gases from them, and show how the analogy of the ventilation of mines does not apply to the case of sewers.

9. Sketch the form of the transverse section of a sewer as generally adopted at the present time, and also the form that it has superseded, pointing out the

advantages claimed for the former. In passing a new sewer down any street or terrace, what would guide you as to the necessary least depth of the invert, irrespective of its connection with the main outfall sewer? At what depth above the invert would you place the connection-pipe from each house?

10. Describe the Irrigation System of utilising the sewage of a town, and in the answer you may refer for details to the particular works at any town you may have visited personally. What is stated by the opponents of this system in objection to it, and what the answer given in reply? How many acres of land would you deem requisite for full utilisation for a town, say of 28,000 inhabitants?

11. Describe the A, B, C process, and refer to any particular works you may have visited. What may be urged against this system? And, if complete responsibility rested upon you, would you recommend its adoption at any large town?

12. Various other systems and processes have been proposed and, in some cases, put in operation; mention these, with your own opinion as to the probability of their ultimate success.

13. You are requested to give, in a brief form, your own views and your own experience as to sewerage and sanitary works generally.

14. Describe the system of sewerage proposed for Kingstown, and in your answer point out the particular difficulties which that locality presents in

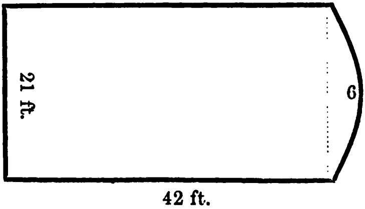
designing a main intercepting sewer. In one important point the plans seem not to include a work deemed necessary elsewhere when the discharge, as in this case, takes place below high-water line.

15. State the area and cubical space for each pupil, required by the Act to be provided by the parish authorities in England before a certificate can be obtained for the sufficiency of the school accommodation. State the volume of space per man, ordered in India and at Home, in new barracks, and the height of room recommended, and hence deduce the superficial area per man, and best proportions of room for twenty-four men. On board troop-ships what cubical space per man should be given?

16. Compare the systems of town supply of water, by pumping engines, and by gravitation from an impounding reservoir. If called upon to report on the sufficiency of a proposed waterworks for a town, how would you satisfy yourself as to the area of the rain basin draining into the reservoir, the volume of storage in the reservoir, the dimensions of the channel or pipe conveying the water down, the area of the filter beds, the dimensions of the straining well, and the arrangements as to continuous supply when repairs may become necessary?

17. State the cubical contents of the barrack-room in the plan annexed, the height being fourteen *feet, and having* one end a circular arc. The area *of the segmental* end may be taken out by the ap-

proximate rule given by Parkes for buildings of the above form. What deduction from the total volume must be made for the body of each person and for the bedding? How many men, at the greatest, should occupy this room?



18. How would you secure the ventilation of the room in the last question? Indicate the best relative positions for inlets and outlets, their proper relative areas, and give in detail the different methods of construction. How many cubic feet of air per hour would you think necessary for the number you have given above?

19. Describe and name the instrument now laid before you, and the method of using it. (*Casella's Air-Meter.*)

20. State the chief recommendations of the three engineers—Messrs. Price, Cotton, and Palles—to whom the Corporation of Dublin referred all the plans for sewerage in this city, and point out how their plan differs from the main drainage authorised by Parliament, but now in abeyance.

21. The schemes for the purification and utilisation of sewage may be classified as:—1. Precipitation processes; 2, Filtration; 3, Irrigation. Under each head point out the more important of the methods in use, naming the inventors or patentees.

22. As to the extent of filtering area in proportion to the population, give the requisite amount as stated by the Rivers Pollution Commissioners, the soil being supposed naturally porous.

In the case of Irrigation, state the usual estimate of engineers for the acreage in proportion to the population.

23. Give in detail an estimate of the least quantity of water for each individual, and adding for municipal and trade purposes (separately), state what number of gallons per diem you would deem necessary for a large town, and compare the intermittent with the constant supply under high pressure.

24. State the annual rainfall in different parts of the United Kingdom, and the causes to which the great observed differences have been attributed. What amount or proportion of this is available for supply of towns, &c., pointing out the manner in which the different contour and nature of the surfaces of the rain basins and their geological characters influence the result.

25. When an inch pipe is discharging a gallon of water per minute, what is the velocity of the

escaping water, and what "head" will give it this velocity?

26. To what does "an inch of rain" correspond in cubic feet of water per square mile? Suppose this amount collected in a reservoir, with horizontal section of fifty yards square, how long would it take to run off through a short pipe of six-inch bore?

27. What is the immediate cause of Fluid Motion, and what are usually the secondary causes?

28. Suppose a hydraulic ram to waste eighty-five per cent. of the power, how much water can it raise 100 feet by the descent of 1,000,000 gallons through eight feet?

29. A ward is twenty by 100 feet on the floor; what must be its height to allow of fifty patients, with thirty cubic yards apiece?

30. Calculate from the fact that he can just float in fresh water; what is the bulk (in cubic feet) of a man of fourteen stone?

31. Explain the Ventilation of a Mine by an up-cast and a down-cast shaft. What terrestrial phenomena illustrate this on a large scale?

32. What is the lowest Inclination which is desirable in a Sewer, and to what rate of flow per second does this correspond?

33. Why should water-pipes be laid down deeper than gas-pipes?

34. Give an estimate of the Quantity of Water

required per day per individual for each necessary purpose.

35. To what is due the usefulness of Animal Charcoal as a filter?

36. Explain the action of a Syphon-trap in a branch drain.

37. Explain why a coal-pit is rendered more dangerous by a fall of the barometer?

38. If a sewer having a circular cross section of two feet diameter, running half full, conveys 1,000 gallons of sewage per minute, what diameter would you require for a circular sewer to convey double the quantity, the inclination being the same?

39. Give the quantity which would flow through the smaller sewer if filled only to one-fourth of its depth.

40. May a sewer be allowed to run quite full habitually or occasionally? State your reasons.

41. To what intensity of pressure in pounds per square inch is an intensity of pressure of three inches of water equivalent?

42. Under what circumstances may the S bends commonly used as traps fail in their object?

43. Will Sewer Gas be likely to accumulate at the upper or lower parts of drains running down a considerable inclination?

44. What are the data you would require to enable you to report on the sufficiency of a proposed scheme of sewage for a given district?

45. The external walls of a hospital ward form a square, the side of which is 150 feet; the internal walls form a square, the side of which is 100 feet, everywhere equidistant from the external walls; the height of the room is fifteen feet. What number of patients will the ward accommodate, giving 1,500 cubic feet of air per patient?

46. If the barometric pressure at the top of a chimney were greater than that at the bottom, while the temperature at the bottom was greater than that at the top, would there be a draught up or down the chimney?

47. Will the pressure at any one point in the mains supplying water to a town remain constant all day if the level of the water in the reservoir is maintained at a constant level?

48. *Hospital accommodation.*

A shed thirty-three feet long, sixteen broad, and thirteen high is to be used as a temporary small-pox ward. How many patients would you put into it? State the grounds on which you form your opinion as to this.

49. *Water supply.*

Explain the terms *temporary* and *permanent* hardness in a water for domestic uses. State to what these are respectively due, and how they are determined.

50. *Sewage.*

(1) State some of the sanitary objections which are made to the disposal of sewage by irrigation.

(2) Shortly describe some one of the chemical methods of defæcating sewage.

51. *Sewage gases.*

What are the means of obviating the escape of gases from gullies?

a. As applied to the gullies.

b. As applied to the sewers.

52. *Earth-closet system of treating sewage.*

State the points to be attended to in order to make it successful as regards—

a. The nature and condition of the earth used.

b. The quantity of the earth required.

c. The superintendence needed.

d. The applicability of the system to small communities, such as villages, and to larger communities, such as towns, respectively.

FORENSIC MEDICINE.*

1. What are the tests for the detection of Meconate of Morphia? To what fallacies are those tests respectively liable? How would you prove the presence of Opium in Porter?

2. A question arises respecting the wholesomeness of water pumped from a well in the vicinity of a churchyard. What peculiar salts, or other substances, should you expect to find in such water? Upon what would you found an opinion as to its being prejudical to health?

3. What do you consider to be a poisonous dose of Lobelia inflata? What are the symptoms of poisoning by this substance, and the most appropriate treatment?

4. Describe the distinctive characters of Oxalic Acid, and the means of detecting it, whether free or combined, in organic mixtures.

5. How may the presence of Chloroform be ascertained in the blood, and in the organised tissues?

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* For answers to these questions see the Author's 'Student's Handbook of Forensic Medicine and Medical *Police.*'

6. Describe the symptoms and treatment of poisoning by the Essential Oil of Bitter Almonds.

7. A pregnant female is suspected to have died from the effects of Savine. On *post-mortem* examination a green powder is found in the stomach. By what characters would you recognise it to be Savine?

8. Enumerate the evidences of recent parturition in a living woman.

9. Describe the condition of the uterus after labour at the full time of pregnancy.

10. Describe fully the symptoms of chronic poisoning by Lead, and the diseases which may attend it; also the various modes by which lead may find its way into the system. In the event of a case proving fatal, what are the appearances that you would expect to find in the dead body? Describe the method of detecting Lead in the tissues?

11. What are the symptoms by which you would recognise a case of poisoning by Oxalic Acid, and what treatment would you adopt? Describe the appearances in the body produced by Oxalic Acid in recent and protracted cases, as well as the processes for detecting this poison in the stomach and tissues.

12. What conditions and diseases are most liable to simulate pregnancy? and how would you distinguish them from pregnancy?

13. A recently married woman is accused of *having already* had a child: what is the evidence by which you would determine this question?

14. Describe in detail the method which you

would adopt in examining the Stomach and its contents in a case of suspected poisoning by Strychnia. Upon what tests would you rely?

15. What method is best adapted to the discovery of Hydrocyanic Acid in the body, after poisoning by its means?

16. Describe the appearances produced in the living body by burning with flame, and scalding with boiling water; and state the conditions which would lead you to form an unfavourable prognosis in both cases.

17. Describe the symptoms and *post-mortem* appearances in poisoning with Corrosive Sublimate; in what manner would you act if called upon to treat such a case?

18. In the case of a female child suffering from severe inflammation of the Vulva, with purulent discharge, what circumstances would make you suspect that such inflammation was the result of attempted violation of her person; or what, on the other hand, would discredit such a supposition?

19. Give the anatomical differences between the Nulliparous and Multiparous Uterus?

20. Describe the tests and characters by which you would distinguish Morphia, Strychnia, Brucia, and Narcotine from each other.

21. How would you determine by *post-mortem* examination which of the three under-mentioned causes had produced perforation of the stomach?—

a. Corrosive poisoning.

β. Ulcerative disease.

γ. Spontaneous or gelatinising perforation.

Describe in full the appearances presented in each case.

22. An unmarried woman with abdominal enlargement has been wrongfully accused of being pregnant: enumerate the various conditions which produced abdominal enlargement, and give the diagnosis of them.

23. A woman in her first pregnancy after marriage is accused of having been pregnant before marriage: how would you prove or disprove this charge?

24. How do you ascertain the presence of mercury in the contents of the stomach? How would you distinguish corrosive sublimate, calomel, and white precipitate from each other in a case of poisoning by them?

25. What chemical means have you of distinguishing the presence of opium in the contents of the alimentary canal?

26. Describe the symptoms produced by the ingestion of poisonous shell-fish; and distinguish them from those occurring in poisoning by metallic irritants, as regards both the immediate and the remote effects.

27. Describe the *characteristic* phenomena which *are manifested* in poisoning by the following *solanaceous plants*:—*Atropa* belladonna, Solanum dulca-

mara, and Hyoscyamus niger. State likewise any physiological or chemical tests which may be usefully applied in distinguishing such cases.

28. What are the *post-mortem* signs which would show that abortion had taken place a few days before death?

29. State the certain signs of pregnancy, and the earliest period at which each is perceptible.

30. Detail the phenomena of Death by Drowning; give your own estimate of their respective values as signs of that mode of death; and describe the most approved methods of restoring animation. State, also, after what period of immersion you would hope to use them with success, as well as the length of time you would persevere in the use of them.

31. What persons are most subject to Spectral Illusions; in what states of system do they occur; by what causes are they produced; and in what conditions of the organ of vision? What analogies do these phenomena supply for application to the mind itself, and what bearing have they on the general question of criminal responsibility?

32. Describe the evidence of fatal chronic poisoning by Tartar Emetic, and the questions that have arisen with regard to it. How would you detect Antimony in the tissues of the body?

33. Describe the general course of operations to which you would submit the contents of the stomach of a person alleged to have died from poison.

34. What are the chemical peculiarities of the colouring matter of the blood; and how are stains of blood upon woollen clothing to be distinguished from those of red paint, and of those of other colouring matter?

35. What are the uses of arsenious acid in the Arts, and of what substitute does it admit? What inconvenience would ensue from the entire prohibition of its sale? If necessary that the public should have access to it, under what restriction should it be furnished?

36. Describe the symptoms and treatment of poisoning by Hydrocyanic Acid.

37. Describe the symptoms and treatment of arsenical poisoning, both acute and chronic.

38. A young unmarried woman, whose respectability is unquestionable, has a considerable abdominal enlargement, which has been gradually increasing for some months; it is uniformly firm and elastic. What points of diagnosis would you endeavour to decide upon before having recourse to examination per vaginam?

39. Enumerate the principal metallic poisons, and state the chemical characters by which they are respectively distinguished, in reference to the means of testing for them, and also to their antidotes.

40. Enumerate the diseases which are more or less stimulated by the symptoms of poisoning by *narcotics. State in* each instance to what extent we

are assisted by *symptoms* in distinguishing the poison cases from those of natural disease.

41. What are the characteristics of a full-grown fœtus?

42. What is the natural duration of pregnancy, and how far is it possible that this period can be exceeded?

43. When the body of a person poisoned by arsenic is exhumed after being interred for several months, what are the appearances which you would expect to find in it, and what are the parts which it would be especially necessary to remove for the detection of the poison? Describe the methods of analysis which you would consider it advisable to pursue in such a case, with the precautions to be observed in the processes adopted.

44. How would you distinguish a burn occasioned after death from a burn inflicted on the human body during life?

45. To what points would you direct your attention with the view of determining whether a contusion observed on a dead subject had been inflicted during life or after death?

46. In examining a woman at the end of pregnancy, how will you distinguish whether she is a primipara or a multipara?

47. What are the signs of recent delivery, and how long after labour will they hold good?

48. *Poisoning with Sulphuric* Acid. (1) Symp-

toms. (2) *Post-mortem* appearances. (3) Treatment. (4) Tests for it on clothes.

49. *Rape.* (1) What constitutes the crime when perpetrated on an adult? (2) What constitutes it when perpetrated on a child? (3) Lesions to be looked for on an adult. (4) Lesions to be looked for on a child. (5) Natural disease which may be mistaken for effects of rape; points to be observed in order to form an opinion as to this.

50. *Cadaveric Rigidity.* (1) Whether retarded or quickened by exposure of the body to cold. (2) By enfeebling disease prior to death. (3) By robust frame at period of death. (4) In what order are the muscles affected by it? (5) In what order does it disappear?

51. *Chronic Poisoning by Lead.* Under what circumstances does it occur? State the symptoms. State prophylaxis and treatment.

52. Bisulphuret of ammonia has been proposed as a test for hydrocyanic acid: describe the mode of using it, its effects, and the nature of the chemical changes which ensue.

53. The earth of a grave in which a body has been interred is stated to contain arsenious acid, either free or in some combination. How would you proceed to determine these points?

54. In the case of a person poisoned by Belladonna, how would you proceed to ascertain the presence of the active principle of this poison in the urine?

55. Describe the symptoms and treatment of poisoning by White Lead.

56. Where a knot upon the cord is assigned as the cause of the child's death, how would you determine whether it had been formed before birth or wilfully tied afterwards?

57. State what you know of Uterine Auscultation in pregnancy.

58. A person was supposed to have been poisoned by a large dose of a white powder, which was suspected to be a vegetable acid, but a question arose as to whether it was oxalic acid, tartaric acid, citric acid, or binoxolate or bitartrate of potassa. How would you settle the question by the chemical examination of the contents of the stomach?

59. What proportion of carbonic acid renders air poisonous? What proportion of nitrogen renders air unfit for respiration? What are the products of burning charcoal and of burning coke, and how would you analytically distinguish them?

60. State the immediate cause of death by drowning; the *post-mortem* appearances observed in fatal cases; the period of actual submersion generally required to cause death; and the means which should be adopted in order to restore suspended animation.

61. Describe the symptoms of poisoning by the *Aconitum napellus*, contrasting them with those produced by the *Atropa belladonna*.

vitality, from which may be deduced an expression for the number living at any given age.

22. State the law according to which unchecked population increases, and illustrate it by a diagram.

23. What is the main obstacle to Indefinite Increase? With this view, how did Malthus propose to modify the law?

24. Quetelet, led by the analogy of physical laws, proposed two fundamental principles as to the law of increase of population and its limits. Which, according to his statement, have been amply verified by experience?

25. Assuming the law of geometric increase, and the fact that the population of England increased in round numbers from nine to eighteen millions in the interval 1801–1851, find the annual ratio of increase.

26. Since the year 1851 to the present time the annual increase has been very nearly maintained at the same rate; how can this be accounted for in the face of Malthus's doctrine of increase of means of subsistence? Taking everything into account, are you of opinion that the present population of England, about 24,000,000, can be long maintained at that figure? Judging from the density of population of other countries, what should be its probable future population?

27. Should the reported weekly death-rates of a *large town* population be taken as an exact criterion of their condition as to health? The year's rate of Dublin in 1871 was 25·5; can you state how this was distributed throughout the year in its first, second, third, and fourth quarter?

28. Draw up a tabular form for representing the weekly and quarterly mortality of a large population distributed according to disease; and also the attendant physical conditions calculated to affect, injuriously or otherwise, the sanitary state of a district.

29. If it be granted that 6 per cent. of vaccinated persons who are attacked by small-pox die, and 66 per cent. of those who have never been, find how many have been well vaccinated, and how many not, in 1,800 cases, of which 480 die.

30. State as many facts as you remember illustrative of the comparative value of male and female life at different ages.

31. State the arguments for and against the dry-earth as opposed to the modern water-closet system, both as regards the public health and the economy of national resources.

32. What is meant by the expression "Death-rate"?

33. What is the relation of Density of Population to Death-rate?

34. Upon what statistical data can an estimate be formed at any period between one decennial census and another, whether and to what extent the population of a district is increasing or not?

62. From what indications would you suspect the existence of *chronic lead poisoning?* How would you proceed to verify your conjecture? And what course of action would you then consider necessary?

63. What facts, if any, are favourable to the belief that arsenic might enter into an *organic compound?*

64. The presence of *arsenic* in the dead body has been attributed (*a*) to its alleged existence as a normal constituent, or (*b*) to its possible derivation from the contaminated earth of a burial place; how would you obviate the objection based on either of these opinions, that might be adduced against the result of an actual investigation, a mere negation being insufficient?

65. What are the circumstances that would justify you in asserting that a *manufacture* is injurious to the health of those engaged in it, or resident in the vicinity?

66. To what other poisons does the noxious principle of the *German Sausage* bear a resemblance in its effects?

67. If you have considered the *Contagious Diseases Acts* of 1864, 1866, 1869, state briefly your reasons for either approving or disapproving of them.

68. On what generally applicable principles would you rely for discriminating between real and *simulated disease?*

69. In deciding a question of *personal identity*, in either the living or the dead, what characters would be appreciable only by the medical examiner, or at least more precisely than they would be by other observers? Refer to any cases, other than a *lis pendens*, as examples.

70. Enumerate the cases in which *morbific matters* (products of disease) are used as prophylactic agents. Give your own opinion as to each, and your reasons for its adoption.

71. What is the difficulty attendant on the detection of *Alum in Bread;* and how would you propose that it should be met?

72. What circumstances favour the action of *water on lead?* State how you would propose to counteract the contaminating influence in cases where it might not be easily practicable to avoid altogether the use of leaden pipes or vessels.

73. When the death of the fœtus at or just before birth, on the termination of the full period of utero-gestation, is attributable to the effect of *secale cornutum* administered to the mother, whether should such result be referred to the toxic, or to the dynamic operation of that drug?

74. In what circumstances, and within what limits, may *cadaveric rigidity* be re-established?

75. Titius, a medical student in a University, volunteers to serve as a private soldier during *a war of defence.* In a skirmish he suffers a sword wound

from which there is much *hæmorrhage, arterial as well as venous;* he is separate from his comrades, and has no surgical or other assistance; yet without bandage, or styptic, or extraneous appliance of any kind, the effusion of blood is effectively controlled. In what state of circumstances do you consider this possible to occur?

76. What morbid effects may have their origin in the introduction into the living system of metals, either in the state of vapour or of very minute division?

77. By what means, practicable on a large scale, may a *hard water* be rendered fit for cooking, washing, and other domestic uses? Explain the rationale of the process you adopt.

78. A tidal river, which is polluted by the outflow from numerous common sewers, often emits a very offensive odour. What evidence, in addition to this, will be requisite to convince you, and enable you to convince others, that this manifest *nuisance* is also *dangerous*, or injurious to health?

79. Distinguish the action of *chloroform* in causing death—

(*a*) When taken in its liquid state into the stomach;

and

(*b*) When inhaled into the lungs in the form of vapour.

Give your reasons for the view you prefer; a so far as your experience and recollection enable you, support your opinion by referring to actual cases and dissections.

80. In the treatment of *acute poisoning*, what are the cases in which (*a*) you would rely on the use of diffusible stimuli; and (*b*) what those for which opiates or other anodynes would be your chief remedies?

81. What are the characters by which you would distinguish *puerperal mania* from hysteria, and from other temporary deviations from sound mind?

82. A spot on a dark-coloured woollen tissue is *suspected to be blood* that might have been effused on it several days previous to your examination. State the means by which you will proceed to investigate its nature; the fallacies to which both chemical and optical evidences are liable; and the reasons by which you are influenced in choosing those on which you rely.

83. A fluid said to be adulterated is sent to you for analysis; the *adulteration charged* being the addition of a matter which exists in the fluid to be examined as one of its normal constituents, but which is variable in its amount. If such adulteration has occurred, but in its quantity has not exceeded the highest possible variation, have you any, and, if so, what chemical means of ascertaining it?

84. Death having ensued, though after an interval *of eight or ten* days, from the infliction of a gunsho

or other wound, what would justify an assertion that such result was attributable, not to the original injury, but to a meddlesome or injudicious surgical treatment?—and, on the contrary, what would you regard as sufficient in such or any analogous case to refute a charge of *mala praxis?*

85. What causes of the *death of the fœtus in utero* are recognisable in a superficial examination without any anatomical assistance?

86. How will you distinguish in the living adult the different conditions of *apoplexy*, *inebriation*, and *narcotism?*

87. What effect has *tobacco* been observed to produce on the heart's action? and to what extent, if any, will you consider the fitness for *life assurance* of one in whom you have discovered the least functional cardiac disease referrible to this cause, to be affected?

88. What will you require to satisfy you that a *manufacture* or a factory may properly be considered as *injurious to health?* What modifying circumstances will you think necessary to be estimated before you form your judgment?

89. State your opinion, with the reasons on which you found it, on the effects of the presence of *living plants* (*phœnogamous*) on the air of sleeping apartments.

90. By what means will you guard against the *propagation of* diseases through the media of clothing

furniture, &c., that have been in actual contact
the sick, or may have been permeated by the
taminated air of ill-ventilated apartments in which
diseased have lain? You will bear in mind that
destruction of offensive smells does not neces-
ly imply the destruction also of the subtile
ter, whatever that may be, by which a febrile or
er contagious disease is communicable.

VITAL STATISTICS.

1. What is meant by a Life Table? Mention some of those that are best known. Illustrate the law of mortality by a diagram.

2. What is meant by the terms "rate of mortality" and "expectation of life"?

3. What is Demoivre's hypothesis as to the law of mortality? Describe it by a diagram, and give the rule according to this hypothesis for finding the expectation of life.

4. What is meant by a Stationary Population? In such a population, an enumeration of the deaths at each age, made at any one period, furnishes sufficient data for a life table.

5. If the yearly births and deaths bear a constant proportion to the population, state the law of increase or decrease, as the case may be, and illustrate by a curve.

6. How is the annual death-rate usually estimated from the weekly returns of mortality among a given population? Let there be 120 deaths in one week in a population of 260,000;—find the death-*rate.*

7. From this law, the population may be esti*mated both forwards* and backwards. For example, according to the Census of 1821 and 1831, the population of Ireland was 6,802,000 and 7,767,000; from these numbers, find the annual rate of increase, and form a table of estimated population at decennial periods, commencing 1801 and ending 1861.

8. According to a recent Parliamentary return, the estimated population, the actual number of deaths from all causes, and the number of deaths from zymotic causes, were as follows in the year 1868:—

	England and Wales.	Scotland.	Ireland.
Population . . .	21,650,000	3,188,000	5,543,000
Deaths from all causes	480,600	69,410	86,180
Deaths from zymotic diseases . . .	117,300	15,170	16,480

Convert these figures into deaths per thousand, so as to compare the characters of the three countries as to general health, and exemption from zymotic diseases.

9. If it be proposed to compare the progress of deaths from disease in general, or of deaths from a particular class of disease, with climatal changes, what atmospheric variations would you select? and how would you lay down the facts so as to ascertain the dependence of the mortality on these changes?

10. It is well known that female life is better

in male life when the experience is taken from nuitants, while the reverse is the case if the exerience be taken from assured lives. State your pinion as to the reason of this.

11. In a letter to the Registrar-General, Mr. Neison insists on the importance of the following six items in the registration of deaths:—Place, date, age, sex, employment, cause of death. Without information as to age and employment, the mere enumeration of causes of death will not enable us to determine the value of life in different localities. State your opinion as to the reason of this.

12. If the population be increasing or diminishing, we must estimate its amount from at least two previous census at given epochs. How is this done? In other words, express the annual rate per cent. in terms of the two populations P and P, and n the number of years' interval.

13. Give the time in which a population doubles itself; state the rule for finding the rate of increase. For example, the population of England and Wales increased, in round numbers, from ten to twenty millions between 1811 and 1861. What was the rate of increase?

14. If called upon to draw up a tabular form to represent the health and mortality of a district, how would you proceed?

State what you think would be proper headings or the columns as to date, classification of diseases zymotic and sporadic, births, deaths, age, physical conditions, &c.

15. What is meant by a Life Table, Expectation of Life, Probable Life? Mention the names and characters of the principal Life Tables in use in this and foreign countries. What was the first Life Table and what the last?

16. If it be found that 370 deaths occur in one week in a population of 400,000 persons, would that state of things be alarming? If so, give your reason.

17. Dr. Farr's Healthy Life Table was constructed by him on the experience of sixty-three so-called "healthy districts." What was the annual death-rate in these?

18. Have great epidemics a considerable effect, or the contrary, on the death-rate of a large population? Give your reasons for your opinion, and any illustrative facts that may occur to you.

19. Mr. Milne, in his *Treatise* on Annuities, remarks—"There can, I think, be no doubt but that the mortality is greater among the higher than the middle classes of society." What circumstances give rise to this opinion? Has it been finally sustained?

20. Is there any ground for the prevalent belief in critical periods of life at the end of each septennial period? From an inspection of a Table or curve of life documents, is there anything to be observed as to the eighth of these periods?

21. State Gompertz' hypothesis as to the force of

mount importance: what is this element, and how does it account for the distribution of atmospheric pressure over the globe?

21. What is the chief cause of the difference between the climates of two countries, the one covered with vegetation and the other not?

Explain the influences of Forests (*a*) on the temperature, (*b*) on the rainfall.

22. Swiss villages being generally built on eminences rising out of the side of the mountains, and bounded on both sides by gorges and ravines, are admirably protected from the cold of winter. What is the cause of this?

What circumstances would you take into consideration in selecting a locality which would afford the best protection for invalids from low temperatures?

23. The beneficial effects of drainage are sometimes as great as if the land had been transported 150 miles southwards. Explain the different ways in which drainage affects the temperature of the soil.

24. *Ozone.*

(1) State the method of ascertaining the presence and proportion in the atmosphere.

(2) State any sources of fallacy to be guarded against in making such observations.

25. Point out the direct information given by the wet and dry bulb thermometers, and the deductions from it.

PATHOLOGY.

1. Name the causes of Perforation of the Stomach, and state the characters and usual localities of the openings.

2. Describe the abnormal conditions of the Skull which result from rachitis.

3. State the characters by which old Apopletic Effusions may be recognised in the Brain.

4. What are the forms of Intracranial Tuberculosis?

5. What are the conditions which have been observed in fatal cases of Spinal Concussion?

6. Describe the characters of Hydatid Cysts which distinguish them from the other forms of cyst found in the human body.

7. Describe the "Miliary Aneurism" of Charcot and Bouchard.

8. Mention the characters that distinguish Amyloïd Degeneration of the Liver when fully developed; and state the opinion of Virchow as to the tissue of the liver in which it first appears.

9. Name the conditions which have been observed as causes of spontaneous fracture of bone.

10. Describe the microscopic characters of Gouty Deposits in the Structures of the Joints; and state in

what other organs they have been most constantly found.

11. What amount of evidence as to the cause of death is afforded by the *post-mortem* state of the cavities of the heart? What circumstance *chiefly* influences the state of the right cavities? In what epidemics and organic diseases is the condition of the auricles and ventricles similar to that observed in the various forms of asphyxia?

12. Can *external post-mortem* appearances ever be looked upon as furnishing certain evidence of the cause of death? If so, mention the nature of the case, enumerate the external signs in question, and describe the internal morbid appearances.

13. Under what circumstances does Cadaveric Putrefaction set in earliest? What internal organ usually resists putrefaction longest? In what form of death does putrefaction (according to Casper) begin at the upper part of the body?

14. What two morbid appearances have been, by some writers, considered as diagnostic of death from starvation, in cases where there is no organic disease capable of obstructing the ingestion of food?

15. One individual dies of famine, or total deprivation of food; another of exhaustion from the closure of the cardiac orifice of the stomach by disease—in these two cases the symptoms preceding death are different. In what respects?

16. Define the varieties of Congenital Hernial

Tumour of the Head, and state the positions in which they have been observed.

17. Compare the pathological appearances of the encephalon observed in fatal Cerebro-spinal Meningitis of epidemic origin, with the effects of encephalitis resulting from depressed fracture of the skull.

18. Contrast Acute Scrofulous Caries of the Dorsal Vertebræ with the alterations produced by the erosion of a large thoracic aneurism involving several vertebræ.

19. Give the anatomical characters of the form of Osteitis, which result from exposure to the fumes of phosphorus.

20. Enumerate the species of Parasitic Cysts occurring in muscles, and give their distinctive characters.

21. State the evidence on which you would found a diagnosis between *post-mortem* blood clots of the heart and great vessels, and those which may have been the cause of death.

22. Give the opinions of Baillie, De la Harpe, and Hodgkin, as to the origin and nature of the white spot on the surface of the Heart. Describe the anatomical characters of the varieties of these spots.

23. What are the histological features of sarcoma?

24. Describe the form of cystic degeneration of the Kidney.

25. Name the conditions under which fatal in-

testinal hæmorrhage has been observed in typhoid fever, and state the sources of the bleeding.

26. What pathological conditions give rise to (*a*) general and (*b*) local anæmia.

27. Explain the relation of Cyanosis to morbid states of the circulation. Describe an example of malformed heart which would cause cyanosis.

28. Describe the appearances as seen by the naked eye and under the microscope in Sclerosis, or Grey Degeneration of the Spinal Cord.

29. Give a brief account of the Morbid Anatomy of ordinary acute Lobar Pneumonia in its different stages.

30. Specify the distinctive characters of Typhoid and of Tubercular Ulcers of the small intestine.

31. Compare and contrast Fatty and Waxy (Amyloid) Liver, as examined with the naked eye and under the microscope.

32. Give an anatomical description of the lesions which are met with in the valves of the heart.

33. Describe a Cancerous Liver, as examined by the naked eye and with the help of the microscope.

34. Give an account of the Pathology of Pyœmia.

35. Describe a Heart in the state of Eccentric Hypertrophy, and specify the causes which may give rise to that condition.

36. Mention the characters, as seen by the naked eye and under the microscope, of the Liver affected with Waxy Degeneration.

37. How is Hydronephrosis produced? Describe a well-marked example of the lesion.

38. Give the naked-eye characters and describe the minute structure of Colloid Cancer. In what situations does it chiefly occur?

39. Describe the waxy degeneration of the spleen known as "Sago Spleen." Under what circumstances is this lesion produced?

40. Mention the distinctive characters of Metastatic Abscesses of the Lung?

41. Describe the structure of Epithelioma as seen by the naked eye and under the microscope. Mention the parts of the body which it chiefly affects, and the course it follows.

42. Give an anatomical description of Saccular Arterial Aneurism; trace its origin, progress, and the effects it produces on the different tissues with which it comes in contact.

43. How is Gelatiniform Softening of the Stomach produced? What are the characteristic appearances produced?

44. By what characters would you recognise the head and the joints of Tænia Solium, Tænia Mediocanellata, and Bothriocephalus Latus respectively?

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